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BIBLIOGRAPHIC DATA SHEET	1. Report No. APTD-0874	2.	3. Recipient's Accession No.
4. Title and Subtitle: Proposed Air Quality Surveillance System for the State of Alabama			5. Report Date: November 1971
			6.
7. Author(s)			8. Performing Organization Rept. No. 18425.008
9. Performing Organization Name and Address: TRW Systems Group, Resources Research, Inc., 7600 Colshire Drive, McLean, Virginia 22101			10. Project/Task/Work Unit No.
			11. Contract/Grant No. 68-02-0048
12. Sponsoring Organization Name and Address: Environmental Protection Agency, Office of Air Programs			13. Type of Report & Period Covered
			14.

15. Supplementary Notes: DISCLAIMER: This report was furnished to the Environmental Protection Agency, Office of Air Programs, in fulfillment of Contract No. 68-02-0048.

16. Abstracts

There are seven Air Quality Control Regions within the State of Alabama. Three are interstate and four are intrastate. For the purpose of defining the minimum equipment required for conducting air quality surveillance systems throughout the United States, criteria has been set forth in the Federal Register. These criteria are based on measured air quality or, estimated air quality and population. The specifics of regional classification are discussed in Section 2.0 and summarized in tabular form. The location of sampling sites in the area of estimated maximum pollutant concentrations are noted in Section 2.0. A timetable for acquisition of needed equipment is presented in Section 5.0. A tabulation of required and existing air quality surveillance equipment is presented. Section 3.0 discusses sample collection and analysis, while data handling is discussed in Section 4.0. Pertinent air quality data collected in State of Alabama are tabulated and presented in the appendix.

17. Key Words and Document Analysis. 17a. Descriptors

Air pollution
Monitoring
Sampling
Regions
Population
Data processing

17b. Identifiers/Open-Ended Terms

Alabama
Air Quality Surveillance Programs
Air Quality Control Regions
Sampling sites
Air pollution detection

17c. COSATI Field/Group 13B

18. Availability Statement	19. Security Class (This Report) UNCLASSIFIED	21. No. of Pages ~~100~~ 102
Unlimited	20. Security Class (This Page) UNCLASSIFIED	22. Price 3.00 - 0.95

FORM NTIS-35 (10-70)

USCOMM-DC 40329-P71

18425.008

PROPOSED AIR QUALITY SURVEILLANCE SYSTEM
FOR THE
STATE OF ALABAMA

November 1971

Prepared For

Environmental Protection Agency
Office of Air Programs

TRW
SYSTEMS GROUP
WASHINGTON OPERATIONS

PREFACE

In developing the Proposed Permit System, Proposed Air Quality Surveillance System, Proposed Emergency Episode Plan, and Proposed Control Strategy portions of the Alabama Implementation Plan, TRW Systems Group has been guided by the intent of the Federal Register, August 14, 1971, as well as extensive direct communication with Environmental Protection Agency and Alabama Division of Air Pollution Control personnel.

We are particularly indebted to Barry Gilbert and William Burch of the Region IV Office, EPA, and William Willis, John Daniel, and Cecil Cork of the Alabama Division of Air Pollution Control for their overall guidance on this project.

A large number of TRW people participated in this project; those with the most direct involvement are listed below.

William Dickerson, Project Manager
John Braswell
Gennaro Cangiano
Fredric Hamburg
Robert Herrick (Herrick Associates)
Steven Plotkin
Michael Stern
Thomas Wright

The work upon which this publication is based was performed by Resources Research, Inc., a subsidiary of TRW Inc., pursuant to Contact No. 68-02-0048 with the Office of Air Programs, Environmental Protection Agency

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AIR QUALITY SURVEILLANCE SYSTEM

STATE OF ALABAMA

1.0 GENERAL OVERVIEW

There are seven Air Quality Control Regions (AQCRs) within the State of Alabama. As shown in Figure 1-1 three are interstate (002, 005, and 007) and four are intrastate (001, 003, 004, and 006).

The geography of the State varies from the coastal region in the south. through the plains of the lower tier of counties, to the semi-mountainous area of the northern third of the State. Industrial activity is principally centered in Birmingham and Mobile, with some concentration of heavy industry along the Tennessee River.

The mountainous northern half of the State is climatically prone to stagnant atmospheric conditions. In those cases where emission densities are high, and especially where local topography confines these emissions to a limited area, there is a significant air pollution episode potential.

Air quality monitoring programs are currently operated by the State, Jefferson County Board of Health, Mobile County Board of Health, the City of Huntsville, the Tennessee Valley Authority (TVA), and the Environmental Protection Agency (EPA).

1.1 REGIONAL CLASSIFICATION

For the purpose of defining the minimum equipment required for conducting air quality surveillance systems throughout the United States, EPA has set forth criteria in the August 14, 1971 Federal Register. These criteria are based on measured air quality or, in the absence of such data, estimated air quality and population. The specifics of regional classification are discussed in Section 2.0 and summarized in Table 1-1. Within each region, at least one sampling site must be located in the area of estimated maximum pollutant concentrations. These are noted in Section 2.0

007 TENNESSEE RIVER VALLEY (ALA.)-CUMBERLAND MTN.s (TENN.) INTERSTATE AQCR
004 METRO BIRMINGHAM INTRASTATE AQCR
003 EAST ALABAMA INTRASTATE AQCR
002 PHENIX CITY, ALA.-COLUMBUS, GEORGIA INTERSTATE AQCR
001 ALABAMA AND TOMBIGBEE RIVERS INTRASTATE AQCR
006 SOUTHEAST ALABAMA INTRASTATE AQCR
005 MOBILE-PENSACOLA-PANAMA CITY-SOUTHERN MISS. INTERSTATE AQCR

Figure 1-1. AIR QUALITY CONTROL REGIONS IN THE STATE OF ALABAMA

Table 1-1. REGIONAL CLASSIFICATION JUSTIFICATION

Region	Pollutant	Priority Classification	Justification
001	PM	II	State Data: Demopolis 1969 maximum 24-hour 161µg/m^3
	SO_2	III	No large point sources
	NO_2	III	"Urban Place" population does not exceed 200,000
	CO	III	"Urban Place" population does not exceed 200,000
	Ox	III	"Urban Place" population does not exceed 200,000
002	PM	I	State Data: Montgomery Fire Sta. #5, 1971 5-mo. geo. mean 117µg/m^3
	SO_2	III	NASN Data: Montgomery 1970 annual arith avg. 6µg/m^3
	NO_2	III	NASN Data: Montgomery 1970 annual arith avg. 43µg/m^3
	CO	III	"Urban Place" population does not exceed 200,000
	Ox	III	"Urban Place" population does not exceed 200,000
003	PM	I	State Data: Gadsden Site 0441, 1971 5-mo. geo. mean 132µg/m^3
	SO_2	III	Calculated max. ground level concentration; annual average, 6µg/m^3.
	NO_2	III	"Urban Place" population does not exceed 200,000
	CO	III	"Urban Place" population does not exceed 200,000
	Ox	III	"Urban Place" population does not exceed 200,000
004	PM	I	Jefferson County Data: North Birmingham 1970-71 annual geo. mean 237µg/m^3

Table 1-1. (continued)

Region	Pollutant	Priority Classification	Justification
004 (cont'd)	SO_2	II	Calculated max. ground level concentration, 24 hour 358µg/m^3
	NO_2	III	EPA Data: Birmingham downtown arithmetic avg. 75µg/m^3, 1971 Summer Study
	CO	I	EPA Data: Birmingham downtown 1-hr max. 37µg/m^3
	Ox	I	EPA Data: Birmingham downtown 1-hr max. 250µg/m^3
005	PM	I	Mobile Data: State Docks 1970 9-mo geo. mean 141µg/m^3
	SO_2	I	State Data: Salco 1-hr max. approx. 1,400µg/m^3
	NO_2	III	NASN Data: 1970 arithmetic avg. 71µg/m^3
	CO	III	EPA Data: State Docks area one month 1-hr max. 6µg/m^3
	Ox	I	EPA Data: State docks area, one month, 1-hr. max. greater than 200 µg/m^3
006	PM	II	State Data: Dothan 1970-71 annual geo. mean 76µg/m^3
	SO_2	III	No large point sources
	NO_2	III	"Urban Place" population does not exceed 200,000
	CO	III	"Urban Place" population does not exceed 200,000
	Ox	III	"Urban Place" population does not exceed 200,000
007	PM	I	State Data: Tuscumbia 1970-71 annual geo. mean 131µg/m^3
	SO_2	I	TVA Data: Widow's Creek vicinity, 1970 1-hr max. approx. 4000µg/m^3
	NO_2	III	EPA Data: 1971 Summer Study, 86µg/m^3 arithmetic mean
	CO	III	"Urban Place" population does not exceed 200,000
	Ox	III	"Urban Place" population does not exceed 200,000

and the locations of all sampling sites; i.e., the expanded system, by UTM coordinates are shown in Appendix B.

The requirements for number and type of air quality monitoring instruments, as defined in the Federal Register, must be met by all states according to a prescribed schedule. Those sampling stations which are designated as episode monitors must be operational within one year after the date of approval of the Implementation Plan by the EPA administrator. The balance of the air quality surveillance system must be operational within two years after such approval. A timetable for acquisition of needed equipment is presented in Section 5.0 of this volume. A tabulation of required and existing air quality surveillance equipment is shown in Table 1-2. Sampling site locations for episode monitoring and minimum requirements network are shown in Figures 1-2 and 1-3 respectively.

Air quality surveillance equipment varies widely in cost. As resources allow, the State of Alabama will expand its surveillance program beyond the system prescribed by the minimum federal requirements. An orderly expansion is described in Section 2.0, and can be used as a guideline to future equipment acquisition and placement within the State. Sample collection and analysis are discussed in Section 3.0. Data handling is discussed in Section 4.0. Both are in accordance with procedures defined in the Federal Register.

Pertinent air quality data collected in the State of Alabama have been tabulated in a consistent format. This information is included as Appendix A of this volume.

Region	Pollutant	Priority	Instrument Type	Number of Sampling Stations: Required Sampling Sites	Existing Sampling Sites	Additional Sampling Sites	Area of Estimated Max. Concentration
001 Alabama and Tombigbee Rivers Intrastate AQCR (population 206,888)	PM	II	Hi Vol	3	3	0	Selma
			Tape	1	0	1	
	SO_2	III	Bubbler	1	0	1	Pennington
	NO_2	III					
	CO	III					
	Ox	III					
002 Phenix City, Alabama Columbus, Georgia Interstate AQCR (total population 718,026; Alabama portion 442,242)	PM	I	Hi Vol	5	9	0	Montgomery Fire Station #5
			Tape	2	0	2	
	SO_2	III	Bubbler	1	0	1	Prattville
	NO_2	III					
	CO	III					
	Ox	III					
003 East Alabama Intrastate AQCR (population 400,943)	PM	I	Hi Vol	6	8	0	Gadsden 0441
			Tape	2	0	2	
	SO_2	III	Bubbler	1	0	1	Childersburg
	NO_2	III					
	CO_2	III					
	Ox	III					

Table 1-2. MINIMUM REQUIRES - AIR QUALITY SURVEILLANCE SYSTEM

Region	Pollutant	Priority	Instrument Type	Number of Sampling Stations: Required Sampling Sites	Existing Sampling Sites	Additional Sampling Sites	Area of Estimated Max. Concentration
004 Metro Birmingham							
Intrastate AQCR	PM	I	Hi Vol	10	16		North Birmingham
			Tape	5	5		
(population 1,043,529)	SO_2	II	Bubblers	3	0	3	
			Continuous	1	0	1	North Birmingham
	NO_2	III					
	CO	I	Continuous	3	1	2	5th N. & 21st Birmingham
	Ox	I	Continuous	3	1	2	5th N. & 21st Birmingham
005 Mobile Pensacola	PM	I	Hi Vol	2	9	0	State Docks, Mobile
Panama City Southern			Tape	2	0	2	
Mississippi Interstate AQCR	SO_2	I	Bubblers	2	0	2	Salco
(total population 2,11,846;	NO_2	III	Continuous	1	0	1	
Alabama portion 411,596)	CO	III					
	Ox	I	Continuous	1	0	1	State Docks, Mobile
006 Southeast Alabama	PM	II	Hi Vol	3	2	1	Dothan
Intrastate AQCR			Tape	1	0	1	
(population 236,184)	SO_2	III	Bubbler	1	0	1	Dothan
	NO_2	III					
	CO	III					
	Ox	III					

Table 1-2. (continued)

Region	Pollutant	Priority	Instrument Type	Number of Sampling Stations: Required Sampling Sites	Existing Sampling Sites	Additional Sampling Sites	Area of Estimated Max. Concentration
007 Tennessee River Valley (Ala) Cumberland Mtns. (Tenn) Interstate AQCR (total population 971,443; Alabama portion 702,773)	PM	I	Hi Vol	7	13	0	Tuscumbia
			Tape	3	0	3	
	SO_2	I	Bubblers	5	0	5	Widow's Creek
			Continuous	2	0	2	
	NO_2	III					
	CO	III					
	Ox	III					

Table 1-2. (continued)

Figure 1-2. EPISODE MONITORING STATION LOCATIONS

NOT REPRODUCIBLE

Figure 1-3. MINIMUM REQUIRED STATION LOCATIONS

2.0 REGIONAL AIR QUALITY SURVEILLANCE PROGRAMS

The following descriptions of air quality surveillance programs includes the design basis for the programs which will meet the Federal Register requirements. In each case there is a description of an expanded surveillance program which encompasses a more thorough sampling network at appropriate sites within the region.

2.1 REGION 001 - ALABAMA AND TOMBIGBEE RIVERS INTRASTATE AIR QUALITY CONTROL REGION

This region, with an area of 8,691 square miles and a population of 206,888 is predominantly rural. Thirty-five significant point sources have been identified in the region, and about twenty of these sources are sawmills or wood product plants. There are five known pulp mills and one ferroalloy plant. Both the industrial activity and the population are centered in Selma, the region's largest city, and in Demopolis. County summaries of annualized emissions are shown in the Control Strategy document. Population by county is shown in Table 2-1.

2.1.1 Existing Air Quality Data

The State has operated samplers for total suspended particulates in Selma and Demopolis since 1969. Beginning in January, 1971, the State has operated high volume air samplers in Evergreen and Grove Hill. Particulate values are generally low, with a low of 35$\mu g/m^3$ geometric mean for the first half of 1971 at Evergreen. Demopolis has the region's highest measured particulate levels, with a 1969-70 annual geometric mean of 55$\mu g/m^3$. At Selma, where the 1970-71 annual geometric mean was 45$\mu g/m^3$, the sampling site is surrounded by large trees and is removed from the principal emission sources. If the sampler were placed at the site of maximum concentration, it is believed that Selma would record the highest particulate levels. The existing air quality data for this region are summarized in Appendix A.

TABLE 2-1 REGION 001 POPULATION (1970 CENSUS)

County	Population
Dallas	55,296
Clarke	26,724
Marengo	23,819
Monroe	20,883
Choctaw	16,589
Wilcox	16,303
Washington	16,241
Conecuh	15,645
Perry	15,388
	206,888

2.1.2 Regional Classification

On the basis of available air quality data and consideration of the emission inventory, this region is classified as priority II for suspended particulates and priority III for all other pollutants (see Table 1-1 for justification). For this classification and population, paragraph 420.17 of the August 14, 1971, Federal Register specifies that the minimum requirements for air quality monitoring for this region must include the following:

- Three high volume samplers monitoring particulates, each collecting one 24-hour sample every sixth day.
- One tape sampler monitoring soiling and collecting one sample every two hours.
- One bubbler monitoring sulfur dioxide and collecting one 24-hour sample every sixth day.

2.1.3 Minimum Requirements

The minimum requirements for monitoring particulates, as specified above for high volume samplers, will be met by the operation of one high volume sampler at Selma and one at Demopolis as these two cities have the largest concentration of industrial activity in the region. One high volume sampler will be located at Evergreen which will be considered a background monitor.

The high volume sampler at Selma will be relocated to the east side of town, which is near the area of estimated maximum pollutant concentration. The high volume sampler in Demopolis will be relocated to a site atop the one-story High School Administration building. This site has little around it to affect wind conditions and, therefore, should provide more accurate sampling results. The current location adjacent to the Fire Department is too far removed from the principal sources and has too many tall trees near the sampler.

The minimum requirement for monitoring soiling will be met by the operation of a tape sampler at Selma. This sampler will be located with the high volume sampler. The minimum requirement for monitoring sulfur

dioxide will be met by the operation of a bubbler at Pennington near a large paper plant, one of the point sources in the region.

2.1.4 Expanded Air Quality Surveillance System

While the above described monitoring network would meet the established federal standards, the following additions to the minimum air quality surveillance system would provide a plan for the long term goals of the Alabama air quality monitoring system. The additions to the system and the rationale are as follows.

A high volume sampler is currently operated at Grove Hill and should be continued in addition to the minimum system. It will be moved from the Clark County Health Department because of its location under a stand of tall trees. The new location will be atop the hospital just south of town which is in an open area.

Two additional high volume samplers should be located in this region and placed one each at Pennington and Jackson. Pennington is the site of one of the large paper plants in the region with visible and noticeable particulate emissions. A possible location for sampling is atop a one-story Post Office Building in Myrtlewood, about 5 miles from the plant. Another possible sampling site is adjacent to a lift bridge operator's station on State Route 114 within 1/2 to 3/4 miles of the plant. In Jackson, the high volume sampler might be located on leased land near the river and adjacent to many of the local sources which include a large paper plant, a large electric generating plant and various wood products companies. If a location by the river could not be secured, a location atop the Leroy High School or the Jackson High School would prove satisfactory.

An additional sulfur dioxide bubbler should be operated adjacent to the high volume sampler at Jackson. Two nitrogen dioxide bubblers should be operated in the region as part of the air quality surveillance network. One of these will be located adjacent to the high volume station in Selma and the other near the high volume station in Demopolis.

Sampling locations and equipment requirements for both the minimum and the expanded air quality surveillance system are summarized in Table 2-2.

TABLE 2-2 REGION 001 SURVEILLANCE SYSTEM

Minimum Federal Requirements			Expanded Air Quality Network	
Location	Instrument	Pollutant	Instrument	Location
Selma*	Hi Vol	Particulate	Hi Vol	Selma
Demopolis				Demopolis
Evergreen (background)				Evergreen (background)
				Grove Hill
				Pennington
				Jackson
Selma*	Tape	Particulate	Tape	Selma
Pennington*	Bubbler	SO_2	Bubbler	Pennington
				Jackson
		NO_2	Bubbler	Selma
				Demopolis

Minimum Federal Requirements Equipment Summary	Expanded Air Quality Equipment Summary
3-Hi Vol(s)	6-Hi Vol(s)
1-Tape Sampler	1-Tape Sampler
1-SO_2 Bubbler	2-SO_2 Bubbler(s)
	2-NO_2 Bubbler(s)

* Area of estimated maximum concentration

2.2 REGION 002 PHENIX CITY, ALABAMA - COLUMBUS, GEORGIA INTERSTATE AIR QUALITY CONTROL REGION

This interstate region contains a total population of 718,026. The Alabama portion encompasses eleven counties with a population of 442,242 and an area of 7,267 square miles. The centers of population are Montgomery and Phenix City, with the balance of the region principally rural. There is relatively little industrial activity in this region. There is light industry in Opelika and pulp mills in Autauga and Russel Counties. With these exceptions, the major industrial activities in this region are wood product plants or sawmills. County summaries of annualized emissions are shown in the Control Strategy document. Population by county is shown in Table 2-3.

2.2.1 Existing Air Quality

The State of Alabama has operated a high volume air sampler in Phenix City since 1967 and, beginning in January, 1971, has operated five high volume samplers in Montgomery and one in Troy. There has been a NASN high volume sampler in Montgomery since 1959 and a gas bubbler since 1969. The highest regional suspended particulate levels have been measured in Montgomery, where the NASN station reported a 1970 geometric mean of $80\mu g/m^3$ and a maximum of $256\mu g/m^3$ for 1970. The State of Alabama's monitoring station at Fire Station No.5 is in an area of higher suspended particulate concentration. The geometric mean for the first half of 1971 was $117\mu g/m^3$.

The NASN gas bubbler data from Montgomery in 1970 indicate that SO_2 and NO_2 are both low, with annual arithmetic averages of $6\mu g/m^3$ for sulfur dioxide and $43\mu g/m^3$ for nitrogen dioxide. The existing air quality data for this region are summarized in Appendix A.

2.2.2 Regional Classification

The population of the total interstate region, based upon the 1970 census figures, was 718,026. The Alabama population of the region was 442,242. Based upon available air quality data and consideration of the

TABLE 2-3 REGION 002 POPULATION (1970 CENSUS)

County	Population
Montgomery	167,790
Lee	61,268
Russell	45,394
Elmore	33,535
Autauga	24,460
Pike	25,038
Macon	24,841
Butler	22,007
Crenshaw	13,188
Lowndes	12,897
Bullock	11,824
	442,242

emission inventory, the region is classified as priority I for particulate and priority III for all other pollutants (see Table 1-1 for justification).

To determine the air quality monitoring equipment required to meet the minimum specification of the federal regulation for an interstate region, the following computation was performed.

By federal standards, this interstate region must have four high volume samplers plus 0.6 per 100,000 population. Therefore

$$4.0 + (0.6 \times 7.18) = 4.0 + 4.31 = 8.31$$

high volume samplers are required for the region. Based on the proportionate population (718,026 total in the region with 442,242 in Alabama) the minimum number of high volume samplers to be placed in the Alabama portion of the region is

$$8.31 \left(\frac{442}{718}\right) = 5.1 \cong \underline{\text{5 high volume samplers for Alabama}}$$

To compute the number of tape samplers, federal specifications state there shall be one tape sampler per 250,000 persons. Therefore

$$\frac{718{,}026}{250{,}000} = \underline{\text{2.87 tape samplers for this interstate region}}$$

with Alabama's share being in proportion to population or

$$\left(\frac{442}{718}\right) 2.87 = 1.87 \cong \underline{\text{2 tape samplers for Alabama}}$$

The minimum requirement for sulfur dioxide is one bubbler. Since the Alabama portion of the region has 60 percent of the population:

$$\left(\frac{442}{718}\right) = 0.6 \cong \underline{\text{1 sulfur dioxide bubbler for Alabama}}$$

2.2.3 Minimum Requirements

In view of the above computations, the Alabama portion of this interstate region must have the following monitoring equipment to meet the federal minimum requirements:

- Five high volume samplers monitoring particulates, each collecting one 24-hour sample every sixth day.
- Two tape samplers monitoring soiling and collecting one sample every two hours.
- One sulfur dioxide bubbler collecting one 24-hour sample every sixth day.

The location of this minimum equipment to accomplish long-range air quality monitoring will include the high volume sampler located at the NASN station in Montgomery. Currently, this equipment is operated atop a three-story building (considering the slope of the ground, this is about 3 1/2 to 4 stories from the ground) of the Montgomery County Health Department. This location is in close proximity to Maxwell Air Force Base, various wood products companies (approximately eight teepee type waste burners), light industry, and agricultural processing.

The second high volume sampler will remain at Fire Station No.5 and will be used as an Episode Monitoring Station. Sources nearby include scrap wood burning, a fertilizer plant, and other particulate sources. Since this sampler is located in the front yard of the fire station, approximately 100 feet from intersecting roads, it is well located. Unless a site on private property closer to the point of maximum concentration can be secured, this station will not be moved.

The third location for a high volume sampler in Montgomery will be a new site at Boylston, a small suburb to the north. Local sources include a glass plant, a fibers and fabric company, light industry, and wood products companies. The best location in this area is at the Resurrection Catholic Church and Convent, about one-half miles due north of the industrial complex. A secondary site location in this area could be atop the Boylston Branch of the Montgomery Post Office, although this site is farther from the industrial complex of interest.

The fourth sampling site will be at Opelika. The current site is somewhat shielded by tall pine trees. As a result, this site will be changed to the Lee County Hospital. The new site has the dual advantage of being closer to one of the potential major local sources, and of not being shielded by trees. In addition, this site offers the same security as the present site.

The fifth sampler location will be the existing site at Phenix City. This is at the Russell County Health Clinic, equivalent in elevation to being on the second floor. Based upon prevailing wind conditions, this location receives most of its sample from Columbus, Georgia, which is only two or three blocks away and across the river.

To complete the minimum federal requirements, one tape sampler will be located at the same site as the high volume sampler at Fire Station #5 in Montgomery. The second tape sampler will be located at the Phenix City location.

The bubbler station, required to monitor sulfur dioxide in the region, will be located near a large pulp and paper plant at Prattville. Site possibilities include one of the service stations within 1/4 to 1/2 miles of the paper plant. If the service station locations are not available, the less desirable sites of the high school or the National Guard building will be considered.

2.2.4 Expanded Air Quality Surveillance System

The above described monitoring network will meet the federal minimum equipment requirements and will include the most desirable sampling locations. The long-term network required to monitor the air quality in this interstate region more thoroughly require the following changes to the existing network, and additions beyond the minimum requirements.

The existing high volume sampler at Trenhold School is close to the same sources of particulates as the NASN sampler; namely Maxwell Air Force

Base, wood waste burners, and wood and agricultural products companies. If the NASN station is moved to a site on the property of the Maxwell Base, the sampler at the Trenholm location could be discontinued. If the NASN station is not moved, the Trenholm sampler should be moved to Water Works #2. This site is closer to the emissions, offers security, and provides competent personnel to operate the equipment.

The existing high volume sampler at Fire Station #11 can be moved after the end of 1971 (one full year of operation) since the suspended particulate concentration is low. This equipment should be relocated in Tuskeegee to a site near the college or the hospital to provide regional background data.

The current location of a sampler at Troy is somewhat removed from the apparent particulate sources one of which is an industrial plant which recovers lead from old automobile batteries. This high volume sampler should be moved to the campus of Troy State University.

A sulfur dioxide bubbler would be operated near the largest point source in the region at Prattville. This would operate concurrently with the high volume sampler at this location. The NASN sulfur dioxide and nitrogen dioxide bubblers in Montgomery should be maintained.

Sampling locations and equipment requirements for both the minimum and the expanded air quality surveillance systems are summarized in Table 2-4.

TABLE 2-4. REGION 002 SURVEILLANCE SYSTEM

MINIMUM FEDERAL REQUIREMENTS			EXPANDED AIR QUALITY NETWORK	
Location	Instrument	Pollutant	Instrument	Location
Montgomery	Hi Vol	Particulate	Hi Vol	Montgomery
NASN				NASN
Fire Station #5*				Fire Station #5*
Boylston				Boylston
Opelika	Hi Vol			Trenthome School
Phenix City	Hi Vol			Troy
				Tuskeegee
				Opelika
				Phenix City
Montgomery	Tape	Particulate	Tape	Montgomery
Fire Station #5*				Fire Station #5*
Phenix City				Phenix City
Prattville*	Bubbler	SO_2	Bubbler	Prattville
				Montgomery (NASN)
		NO_2	Bubbler	Montgomery (NASN)

Minimum Federal Requirements
Equipment Summary

5 - Hi Vols
2 - Tape Samplers
1 - SO_2 Bubbler

Expanded Air Quality
Equipment Summary

8 - Hi Vols
2 - Tape Samplers
2 - SO_2 Bubblers
1 - NO_2 Bubbler

Episode Monitoring Station

* Area of estimated maximum concentration

2.3 REGION 003 - EAST ALABAMA INTRASTATE AIR QUALITY CONTROL REGION

This region, consisting of ten counties with an area of 6,228 square miles and a population of 400,943, has an economy primarily dedicated to agriculture and forest products. The northern portion of the region is composed of hills and valleys while the southern portion is generally flat. Industrial activity is centered in Talladega, Calhoun, and Etowah Counties, with the major industrial activity in the towns of Gadsden, Childersburg, and Anniston. County summaries of annualized emissions are shown in the Control Strategy document. Population by county is shown in Table 2-5.

2.3.1 Existing Air Quality Data

The State has operated a high volume sampler in Anniston since 1969. Beginning in 1971, the State has operated high volume samplers in Sylacauga and Talladega. The State has operated two high volume samplers in Gadsden since the beginning of 1971, and an NASN sampling station has operated in Gadsden since 1964. While the particulate measured at Talladega has been high, the readings are distorted. The high volume sampler is located in the yard of the Health Department next to a dusty area and near an area where wrecked automobiles are burned.

The highest recently measured particulate concentrations are at site 0441 in Gadsden, where the geometric mean for the first half of 1971 is 132 $\mu g/m^3$. Site 0440 in Gadsden showed a 1971 half-yearly geometric mean of 106 $\mu g/m^3$ of suspended particulates. The air quality data for this region are summarized in Appendix A.

2.3.2. Regional Classification

On the basis of existing air quality data and consideration of the emission inventory, this region is classified as priority I for suspended particulates and priority III for all other pollutants. (See Table 1-1 for justification.)

TABLE 2-5. REGION 003 POPULATION (1970 CENSUS)

County	Population
Calhoun	103,092
Etowah	94,144
Talladega	65,280
Chambers	36,356
Tallapoosa	33,840
Randolph	18,331
Cherokee	15,606
Clay	12,636
Cleburne	10,996
Coosa	10,662
	400,943

Since there are no measured air quality data for sulfur dioxide in the region, an estimate of the predicted concentration is required for regional priority classification. The dominant point sources in the region are the Republic Steel coke ovens in Gadsden and the Alabama Power and Kimberly Clark power plants near Childersburg. The Alabama Power stack was selected for calculation. This point source has a physical stack height of 150 feet, burns coal with a sulfur content of 1.50 percent, has SO_2 emissions of 3,830 tons/year and is rated at 1494 million BTU/hour. The maximum arithmetic average ground-level concentration was determined using the procedure outlined in "Sensitivity Analysis of Selected Air Quality Implementation Planning Program Input Parameters," prepared for EPA by TRW Systems under Contract No. PH 22-68-60. Estimated parameters were:

- Stack Temperature - 465°F
- Stack Diameter - 3.0 meters
- Stack Velocity - 13 meters/second
- Pressure - 1000 mb
- Ambient Temperature 70°F

The calculated normalized plume rise is 193 meters^2/second. Using a conservative effective stack height of 50 meters, a normalized maximum concentration of 0.6 ($\mu g/m^3$)/(ton/day) is determined. With a daily emission rate of 10.4 tons/day, the estimated maximum annual arithmetic average ground level concentration is 6.2 $\mu g/m^3$. Since this is far below the 60 $\mu g/m^3$ level set for priority II classification and since uncalibrated models of the type used for this calculation historically overpredict ground level concentrations, the region is classified as priority III for sulfur dioxide.

The minimum requirements for air quality monitoring for this classification and population are as follows:

- Six high volume samplers monitoring particulates, each collecting one 24-hour sample every sixth day.
- Two tape samplers monitoring soiling, each collecting one sampler every two hours.
- One bubbler monitoring sulfur dioxide and collecting one 24-hour sample every sixth day.

2.3.3 Minimum Requirements

An air quality monitoring network designed to include the equipment specified as meeting the above federal minimum requirements will be as follows:

For monitoring suspended particulates, two high volume samplers will be located in Gadsden. The NASN site will be utilized. The sampler at State site 0441 is currently at the Walnut Park South Gadsden Engine Company No.7, due west of town. However, since this location is somewhat obstructed by buildings, the sampler will be moved to the Gadsden Street Department building. A tape sampler will be located with this high volume sampler. The tape sampler site is designated as an episode monitoring station.

One high volume sampler and one tape sampler will be located in Childersburg. A large pulp mill operates about one mile south of town and a steam generating plant is located about five miles east of town. The samplers will be located on the roof of the trade school one mile east of town. Alternate sites are the Water Works building and the Police Department building.

One high volume sampler will be located in Alexander City at the Alexander City Junior College. This location is about one mile southwest of town and near light industry including two foundries, a wood plant, and an asphalt batch plant.

One high volume sampler will be located in Anniston at the Blue Mountain Post Office. This is a one-story brick building in a combined residential/light industrial valley. Numerous pipe and valve companies operate in this area.

One high volume sampler will be located in Talladega at a new site at the Federal Building. This site is on the west side of town, close to a small industrial area.

To complete the minimum requirements, one sulfur dioxide bubbler will be operated at the Childersburg sampling site.

2.3.4 Expanded Air Quality Surveillance System

The geographical and industrial complexity of this region suggest that the existing air quality data may be representative of only a small area. Since this region is in the meteorologically episode-prone portion of the State, it is advisable to acquire some data on the potential for elevated concentrations of the gaseous pollutants. Particulate monitoring at the minimum requirements level is fairly complete.

In Gadsden, the second State high volume sampler currently operating at site 0440 is located at Fire Station Engine Company No. 6. This is close to a large manufacturing plant and a steam generating plant. The East Gadsden Community Center is a one-story building closer to both of these sources, and is not hindered by trees or nearby obstructing buildings. The sampler should be moved to the East Gadsden Community Center. It would be desirable to operate a bubbler for SO_2 and NO_2 to determine the levels of these gaseous pollutants.

Anniston is in a valley in which there are three distinct areas where air quality may be different. One area, the Blue Mountain Post Office, should be monitored by high volume samplers. (This area is included in the minimum requirements). The other two areas can be monitored by high volume samplers located in the downtown area at the Court House and in the Oxford area south of Anniston. The most desirable site in Oxford is the roof of the Quintard Mall shopping center. An alternate site is the Oxford High School.

The current high volume sampling site at Sylacauga, which is behind the Health Clinic in an open grassy area, can be continued.

Since there is no existing station suitable to determine background concentrations of pollutants, Ashland has been identified as a location for background sampling in this region.

Unpublished data from the National Air Pollution Control Administration (the predecessor to EPA) suggests that elevated nitrogen dioxide concentrations may exist in some portions of this region. To verify this possibility, nitrogen dioxide bubblers should be operated in conjunction with the high volume samplers in Anniston, Gadsden, Childersburg, and Ashland. This sampling can be discontinued after one year if the results compare favorably with the ambient air quality standards.

Sampling locations and equipment requirements for both the minimum and expanded air quality surveillance systems are summarized in Table 2-6.

Table 2-6. REGION 003 SURVEILLANCE SYSTEM

Minimum Federal Requirements				Expanded Air Quality Network
Location	Instrument	Pollutant	Instrument	Location
Gadsden (0441) *	Hi Vol	Particulate	Hi Vol	Gadsden (NASN)
Gadsden (NASN)				Gadsden (0440)
Childersburg				Gadsden (0441) *
Alexander City				Talladega (Federal Bldg)
Anniston (Blue Mountain Post Office)				Anniston (Blue Mountain Post Office)
Talladega (Federal Bldg)				Anniston (Court House)
				Anniston (Oxford)
				Sylacauga
				Alexander City
				Childersburg
				Ashland (Background)
Gadsden (0441)*	Tape	Particulate	Tape	Gadsden (0441)*
Childersburg				Childersburg
	Bubbler	SO_2	Bubbler	Gadsden (0440)
Childersburg *				Childersburg*
		NO_2	Bubbler	Gadsden (0440)
				Childersburg

*Area of estimated maximum concentration
Episode Monitoring Station

Table 2-6. (continued)

Minimum Federal Requirements			Expanded Air Quality Network	
Location	Instrument	Pollutant	Instrument	Location
				Anniston (Blue Mountain Post Office)
				Anniston (Court House)
				Anniston (Oxford)
				Ashland (background)
Equipment Summary			Equipment Summary	
6 - Hi Vols			11 - Hi Vols	
2 - Tape Samplers			2 - Tape Samplers	
1 - SO_2 Bubbler			2 - SO_2 Bubblers	
			6 - NO_2 Bubblers	

* Area of estimated maximum concentration
Episode Monitoring Station

2.4 REGION 004 - METROPOLITAN BIRMINGHAM INTRASTATE AIR QUALITY CONTROL REGION

Jefferson, Tuscaloosa, and Shelby Counties dominate the economy of this 11,000 square mile region. The remaining counties have agricultural or forest-based economies. Jefferson and Tuscaloosa Counties contain 73 percent of the regional population of 1,043,529. The geography of this region varies from the plains of the southwestern portion to the mountains of the eastern portion.

The poor air quality in Birmingham is well documented and it represents the major air pollution control problem within the region. County summaries of annualized emissions are shown in the Control Strategy document. Population by county is shown in Table 2-7.

2.4.1 Existing Air Quality Data

The Jefferson County Health Department began an air quality surveillance program in 1965, taking up where a special federally funded study in 1964-1965 concluded. A substantial body of air monitoring information is available. A federal National Air Surveillance Network high volume sampler has operated in Birmingham since 1957; and information is available for suspended particulates, sulfur dioxide, nitrogen dioxide, aldehydes and ammonia from 1969. Since mid-1970, EPA has operated an automated sampling van obtaining information on nitrogen dioxide, total nitrogen oxides, sulfur dioxide, carbon monoxide, oxidants, hydrocarbons, suspended particulates and soiling.

The maximum suspended particulate concentration in the region has consistently been measured at the North Birmingham sampling station, where the 1970-1971 annual geometric mean was 237 $\mu g/m^3$. Elsewhere in Birmingham 1970-1971 geometric means were 170 $\mu g/m^3$ at the EPA downtown trailer, and 131 $\mu g/m^3$ at Bessemer. A 1971 half yearly geometric mean of 162 $\mu g/m^3$ has been measured at Leeds, in close proximity to a cement plant.

TABLE 2-7. REGION 004 POPULATION (1970 CENSUS)

County	Population
Jefferson	644,991
Tuscaloosa	116,029
Walker	56,246
Shelby	38,037
St. Clair	27,956
Blount	26,853
Chilton	25,180
Pickens	20,326
Sumter	16,974
Fayette	16,252
Hale	15,888
Lamar	14,335
Bibb	13,812
Greene	10,650
	1,043,529

The annual arithmetic average nitrogen dioxide concentration in Birmingham, measured at the NASN sampling station at 720 South 20th Street, was 110 $\mu g/m^3$ in 1970. The 1971 EPA Summer Study reported an average value of 75 $\mu g/m^3$. Sulfur dioxide has consistently been measured as about 25 $\mu g/m^3$.

The highest pollutant concentrations measured at the EPA trailer site in downtown Birmingham occurred during an episode on April 16, 1971. The maximum one-hour CO concentration was 32.5 ppm and the maximum one-hour total hydrocarbon concentration was 10 ppm. The suspended particulate concentration was 499 $\mu g/m^3$ over a 24-hour averaging time. Soiling index peaked at 5.7 COHs/1000LF. The air quality data for this region are summarized in Appendix A.

2.4.2 Regional Classification

Based on the available air quality data for Birmingham, this region is classified as priority I for particulates, carbon monoxide, and oxidants, and priority III for nitrogen dioxide. (See Table 1-1 for justification.)

The largest point source of emission of SO_2 in the region is the Alabama Power generating station in Greene County, with emissions of 51,909 tons/year. Sources in the Fairfield section of Birmingham have nearly the same total, but are numerous rather than a single point. For the power station in Greene County, using the point model of Appendix A of the August 14, 1971, Federal Register with parameters of 600 meters for L, 175 meters for σ_y and 4 meters/second for u, the maximum 24-hour SO_2 concentration is calculated as 358 $\mu g/m^3$. This defines a priority II classification for sulfur dioxide.

Minimum sampling requirements are as follows:

- For particulates, ten high volume samplers, each collecting one 24-hour sample every sixth day and five tape samplers, each collecting one sample every two hours.

- For oxidants, three continuous gas phase chemiluminescence analyzers.
- For carbon monoxide, three continuous non-dispersive infrared analyzers, or equivalent.
- For sulfur dioxide, three bubblers, each obtaining one 24-hour sample every sixth day, and one continuous analyzer.

2.4.3 Minimum Requirements

While the principal surveillance effort must be expended in Birmingham, there are other areas within the region which require attention. Tuscaloosa and Leeds, in particular, should have air quality monitoring.

The topography of Birmingham is a primary consideration in design of an air quality surveillance system. The Jones Valley is the main populated area with the industrial area following the northwesterly line referred to as the Opossum Valley. The major heavy industry in Birmingham is in the Opossum Valley.

The northeast-to-southwest orientation of the valley results in channeling of winds. The major industrial development is in North Birmingham with large steel plants (one owner) located in Fairfield and Ensley. There is moderate industrial development in the Bessemer area and light industry is generally spread through the area. Six of the ten high volume samplers in the region will be located in Birmingham.

To accomplish a good geographical coverage of the highest pollutant concentrations, sampling sites are necessary at North Birmingham, downtown, and Fairfield. These three stations are designated as episode stations. Each site will have a high volume sampler, tape sampler, and continuous oxidant and CO analyzers. The Fairfield station is nearest to the major SO_2 emission sources and will have a continuous SO_2 analyzer while the other two will have SO_2 bubblers. High volume samplers will be located at

Mountain Brook, NASN and Bessemer to complete the minimum geographical coverage of Birmingham.

A study* of automobile emission density, based on a traffic analysis, indicates that the present location of the EPA trailer at First Avenue and 14th Street is slightly removed from the area of maximum automotive exhaust emission density. Relocation of the downtown site to within three blocks of the intersection of 5th Avenue North and 21st Street will provide sampling in an area where automobile emissions are nearly double those at the present site.

The present North Birmingham sampling site location is satisfactory. In Fairfield, the Fairfield City Hall is the best site for a new sampling station because of proximity to both the industrial sources and the major traffic artery through the Fairfield section.

Outside of Birmingham, high volume samplers will be operated in those areas where measured particulate levels are high or where the emission inventory indicates a potential for elevated pollutant concentrations. These sites are Tuscaloosa, Leeds (0660), and Jasper. A sulfur dioxide bubbler and tape sampler will be located in Tuscaloosa because of proximity to a pulp mill. A tape sampler will be located at Leeds (0660) because of elevated particulate concentrations. At a background site in Chilton, Blount, Lamar, or Hale County (to be finally selected based on local conditions and availability of personnel to operate the equipment), a high volume sampler will be operated to acquire information on the minimum regional concentration of this pollutant.

2.4.4 Expanded Air Quality Surveillance System

The minimum requirements program described will provide basic information but will not meet all the regional needs for air quality data.

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* "Final Report On The Emissions Inventory For The State Of Alabama", August 1971, TRW #18425.001.

The geographical coverage of Birmingham is scanty, and there are other potential areas of elevated particulate concentration within the region which should have air quality monitoring. The NASN data for nitrogen dioxide suggests that concentrations of this pollutant may approach or exceed the ambient air quality standards in some portions of the region, so bubblers will be included in the expanded system.

In Birmingham, the area matrix of high volume samplers should be expanded to include Tarrant City, Woodlawn, West End, Pratt City Park, Dolomite, and the NASN station near the Health Department offices.

The NASN station will continue to acquire bubbler data on sulfur dioxide and nitrogen dioxide. Since the NASN high volume sampler filters are analyzed for many chemical components, these results should be the basis for trend analysis of specific components of suspended particulate matter.

Nitorgen dioxide bubblers will be operated at North Birmingham, the downtown site, Fairfield, Mountain Brook, Bessemer, Tuscaloosa, Jasper, and at the background site. For convenience, these bubblers will be operated on the same sampling schedule as the high volume samplers.

Based on measured particulate levels and the regional emission inventory, high volume samplers should be operated in Holt, Pell City, Ragland, Fayette, and Columbiana.

Sampling locations and equipment requirements for both the minimum and the expanded air quality surveillance systems are summarized in Table 2-8.

Table 2-8. REGION 004 SURVEILLANCE SYSTEM

MINIMUM FEDERAL REQUIREMENTS			EXPANDED AIR QUALITY NETWORK	
Location	Instrument	Pollutant	Instrument	Location
Birmingham				Birmingham
N. Birm.*	Hi Vol	Particulate	Hi Vol	N. Birmingham*
Downtown				Downtown
Fairfield				Fairfield
Mountain Brook				Mountain Brook
Bessemer				Bessemer
Irondale				Irondale
Tuscaloosa (A)				Tarrant City
Leeds (0660)				Woodlawn
Jasper				West End
Background				NASN
				Pratt City Park
				Dolomite
				Tuscaloosa (A)
				Holt
				Leeds (0660)
				Jasper
				Pell City
				Ragland
				Fayette
				Columbiana
				Background

Table 2-8. (continued)

MINIMUM FEDERAL REQUIREMENTS			EXPANDED AIR QUALITY NETWORK	
Location	Instrument	Pollutant	Instrument	Location
Birmingham N. Birmingham* Downtown Fairfield Tuscaloosa (A) Leeds (0660)	Tape	Particulate	Tape	Birmingham N. Birmingham * Downtown Fairfield Tuscaloosa (A) Leeds (0660)
Birmingham Fairfield*	Cont.	SO_2	Cont.	Birmingham Fairfield*
Birmingham Downtown N. Birmingham Tuscaloosa	Bubbler	SO_2	Bubbler	Birmingham Downtown N. Birmingham Tuscaloosa(A) NASN
Birmingham N. Birmingham Downtown Fairfield	Cont.	CO		Birmingham N. Birmingham Downtown Fairfield
Birmingham N. Birmingham Downtown* Fairfield	Cont.	Oxidants		Birmingham N. Birmingham Downtown * Fairfield
	Bubblers	NO_2	Bubblers	Birmingham N. Birmingham Downtown

Table 2-8. (continued)

MINIMUM FEDERAL REQUIREMENTS		EXPANDED AIR QUALITY NETWORK		
Location	Instrument	Pollutant	Instrument	Location
		NO_2	Bubblers	Fairfield
				Mountain Brook
				Bessemer
				NASN
				Tuscaloosa (A)
				Jasper
				Background

Minimum Federal Requirements
Equipment Summary

10 - Hi Vols
5 - Tape Samplers
1 - Continuous SO_2
3 - SO_2 Bubblers
3 - Continuous CO
3 - Continuous Oxidant

Expanded Air Quality
Equipment Summary

21 - Hi Vols
5 - Tape Samplers
1 - Continuous SO_2
4 - SO_2 Bubblers
3 - Continuous CO
3 - Continuous Oxidant
9 - NO_2 Bubblers

*Area of estimated maximum concentration

Episode Monitoring Station

2.5 REGION 005 - MOBILE-PENSACOLA-PANAMA CITY SOUTHERN MISSISSIPPI INTERSTATE AIR QUALITY CONTROL REGION

This three-state region encompasses a total population of 1,111,846, of which the Alabama population is 411,596. The area of the three Alabama counties is 3,780 square miles. The climate and topography are typical of areas of the Gulf Coast, i.e., flat, in some cases marshy and quite rainy. The annual prevailing wind in Mobile is 10 mph from the north. Mobile dominates the industrial economy of the region. There is some minor agriculaural and forest industry in Escambia County and Baldwin County. County summaries of annualized emissions are shown in the Strategy section. Population by counties is shown in Table 2-9.

2.5.1 Existing Air Quality Data

In Mobile the National Air Surveillance Network has operated a high volume sampler since 1958 and a gas bubbler since 1969. This sampling site on the roof of the Board of Health Building at 248 Cox St. is somewhat removed from both the industrial area and the central business district.

The Mobile County Health Department has an active sampling program. Suspended particulates, dustfall and sulfation rate are sampled at Axis, the Mobile State Docks, the Police Building, the Central Fire Station, Theodore, Brookley Field, Pritchard, and the intersection of General Bullard and Airport Roads. In addition, special sampling is performed where the activities of specific local sources warrant. The Mobile County Health Department conducted an extensive study in the three-county region in 1969. Sufficient data were collected to justify the conclusion that the particulate problem in this region is centered in the industrial area around the State Docks. Annual geometric mean suspended particulate concentrations at the State Docks Administration Building were 120 and 141 $\mu g/m^3$ in 1969 and 1970, respectively. The 1969 and 1970 geometric mean suspended particulate concentrations at the City Fire Station were 145 and 130 $\mu g/m^3$, respectively. These data represent regional maxima for suspended particulates. The lowest recent value was determined during the last half of 1969 at Robertsdale, where the geometric mean was 39$\mu g/m^3$ and the highest value of 22 samples was 77$\mu g/m^3$.

TABLE 2-9. REGION 005 POPULATION (1970 CENSUS)

County	Population
Mobile	317,308
Baldwin	59,382
Escambia	34,906
	411,596

The results of the NASN sampling and the Mobile County sampling indicate that the benzene soluble fraction of suspended particulates is extremely high in Mobile. The Mobile Health Department routinely analyzes high volume filters for benzene soluble content, nitrate content, and sulfate content as well as total suspended particulate.

Since mid-1970, EPA has had an automated sampling van on loan to the State of Alabama in operation in the State Docks area at the transmitter of radio station WKRG. This trailer contains instrumentation for total suspended particulate, spot samples, total nitrogen oxides, nitrogen dioxide, sulfur dioxide, hydrocarbons, carbon monoxide and oxidants. Oxidant levels sometimes exceed 0.1 ppm on an hourly basis and very high hydrocarbon levels, eg., 10 to 15 ppm, are detected some four to eight hours prior to the oxidant peaks. Recorded hydrocarbon, oxidant and suspended particulate levels are high, while other pollutant levels are relatively low.

The state has operated a sampling van at Salco, which is north of metropolitan Mobile. In this vicinity there is a cellulose chemical plant and a large power generation station. The pollutants measured at this location were nitrogen oxides, sulfur dioxide, hydrocarbons, suspended particulates and soiling. There have been some measurements for hydrogen sulfide using lead acetate-treated tape in a separate tape sampler. The results of sampling at this station indicate that peak readings over 1 ppm of sulfur dioxide, hydrocarbon peaks in excess of 20 ppm, and oxidant peaks in excess of 0.1 ppm have been encountered. The arithmetic average suspended particulate for a two-month period is 129$\mu g/m^3$, dominated by one or two very high readings

A summary of pertinent air quality data is shown in Appendix A.

2.5.2 Regional Classification

On the basis of measured air quality data in Alabama, this region is classified as priority I for suspended particulate, sulfur dioxide, and oxidants. Nitrogen dioxide and carbon monoxide are classified as priority III (see Table 1-1 for justification). Minimum sampling requirements for the three-state region are:

- For particulates, ten high volume samplers, each collecting one 24-hour sample every sixth day, and four tape samplers, each collecting a sample every two hours.
- For sulfur dioxide, eight bubblers, each collecting one 24-hour sample every sixth day, and three continuous analyzers.
- For oxidants, three continuous analyzers.

Apportionment of these samplers on the basis of population calls for minimum sampling requirements in Alabama, as:

- For particulates, four high volume samplers collecting one 24-hour sample every sixth dat, and two tape samplers collecting a sample every two hours, operating continuously.
- For sulfur dioxide, three bubblers collecting one 24-hour sample every sixth day, and one continuous analyzer.
- For oxidants, one continuous analyzer.

2.5.3 Minimum Requirements

Evaluation of existing air quality data and consideration of the emission inventory indicate that Mobile is the major air pollution problem in the three-county Alabama portion of this region. Particulate emission density is highest in the area of the state docks, north of downtown Mobile. The sulfur dioxide point sources are a large steam-electric generating station north of Salco and the pulp mills near the state docks. Hydrocarbon emissions are not quantified, but the major traffic density is along Government Street just west of downtown.

The particulate samplers will be sited at the WKRG transmitter, the present NASN site at the Board of Health Building, at the Central Fire Station and at Robertsdale. Each of these sites will have a high volume sampler. Tape samplers will be located at the WKRG transmitter and at the NASN site, and these sites will be episode stations for particulates.

The continuous sulfur dioxide analyzer will be located at Salco, which is near the point of maximum ground level concentration of the power plant. This site is between the power plant and the state docks

area, so it is between the principal point sources. Since this location is in close proximity to a cellulose process chemical plant, the sampler must be specific for sulfur dioxide; e.g., a flame photometric analyzer preceded by a gas chromatographic column which will separate the various sulfur compounds. This will be an episode monitoring station for sulfur dioxide.

The three sulfur dioxide bubblers will be located at the WKRG transmitter, at Salco as back-up to the continuous instrument, and the NASN station.

The oxidant analyzer, an episode monitor, will be located at the WKRG transmitter.

2.5.4 Expanded Air Quality Monitoring System

The air pollutant levels in Mobile are high, and the sources of benzene soluble particulates and ambient hydrocarbons have not been identified. The expanded air quality surveillance system will provide good geographical coverage of pollutant concentrations and data which can be used to define the source of the hydrocarbons so that adequate control measures can be developed.

High volume samplers, in addition to those at the WKRG transmitter, Central Fire Station, and the NASN site, will be located at Salco, Creola, Saraland, Prichard, State Docks Administration Building, Police Building, General Bullard and Airport Road, Brookley Field, Cottage Hill, Theodore, and Hollinger's Island. Outside Mobile County, high volume samplers will be operated at Atmore and Brewton.

The sampling station at the WKRG tramsmitter, in addition to oxidants, will measure methane and nonmethane hydrocarbons as well as wind speed and direction. This should provide adequate information to locate the source(s) of these air contaminants. An NO_2 bubbler will operate in conjunction with the SO_2 bubbler, on the same schedule, to provide additional information on this pollutant for a period of about one year to verify the NASN bubbler results.

To best establish the concentration of automobile exhaust-based pollutants, a new sampling station will be established near the intersection of Government and Jackson Streets. At this site, suspended particulates will be measured by high volume sampler, CO will be measured by a non-dispersive infrared analyser, and oxidants will be measured by chemiluminescence. The tape sampler will be operated here rather than at the Board of Health building.

The downtown episode station will be established at Government and Jackson Street to centralize the monitoring activities.

Sampling locations and equipment requirements for both the minimum and the expanded air quality surveillance systems are summarized in Table 2-10.

Table 2-10. REGION 005 SURVEILLANCE SYSTEM

Minimum Federal Requirements		Pollutant	Expanded Air Quality Network	
Location	Instrument		Instrument	Location
WKRG Transmitter *	HiVol	Particulate	HiVol	WKRG Transmitter *
Board of Health Bldg. (NASN)				Board of Health Bldg (NASN)
Central Fire Station				Government/Jackson Sts.
Robertsdale (Background)				Salco
				Creola
				Saraland
				Pritchard
				State Docks Ad. Bldg.
				Central Fire Station
				Police Bldg.
				Gen. Bullard/Airport Blvd.
				Brookley Field
				Cottage Hill
				Theodore
				Hollinger's Island
				Atmore
				Brewton
				Robertsdale (background)

Table 2-10. (continued)

Minimum Federal Requirements		Pollutant	Expanded Air Quality Network	
Location	Instrument		Instrument	Location
WKRG Transmitter *	Tape	Particulate	Tape	WKRG Transmitter*
Board of Health Bldg				Government/Jacksons Sts.
Salco *	Cont.	SO_2	Cont.	Salco*
WKRG Transmitter	Bubbler	SO_2	Bubbler	WKRG Transmitter
Board of Health Bldg. (NASN)				Board of Health Bldg (NASN) Salco
Salco		NO_2	Bubbler	Board of Health Bldg (NASN)
WKRG Transmitter *	Cont.	Oxidant	Cont.	WKRG Transmitter*
				Government/Jackson Sts.
		CO	Cont.	Government/Jackson Sts.
		Methane and Non-Methane Hydrocarbons	Cont.	WKRG Transmitter
		Wind Speed and Direction		WKRG Transmitter

Minimum Federal Requirements Equipment Summary	Expanded Air Quality Equipment Summary	
4-HiVols	18-HiVols	1-Cont. CO
2-Tape samplers	2-Tape samplers	1-Cont. Methane and Non-methane hydrocarbon
1-Continuous SO_2	1-Cont. SO_2	1-Wind speed and direction
3-SO_2 bubblers	3-SO_2 bubblers	
1-Cont. Oxidant	1-NO_2 bubbler	
	2-Cont. oxidant	

* Area of estimated maximum concentration

Episode monitoring station

2.6 REGION 006 - SOUTHEAST ALABAMA INTRASTATE AIR QUALITY CONTROL REGION

This region, with an area of 4838 square miles and a population of 236,184, has relatively little industrial activity. The major employers in the region are military installation at Fort Rucker and Dothan. The topography is generally of a level or a very gently rolling contour. Because of these factors, there are essentially no serious areawide air pollution problems in the region of Alabama. County summaries of annualized emissions are shown in the Strategy Section. County populations are shown in Table 2-11.

2.6.1 Existing Air Quality Data

The State of Alabama has operated high volume samplers in the metropolitan area of Dothan since 1970 and in Andalusia since January 1971. The highest measured suspended particulate levels in this region are at the Dothan sampling location, where the 1970-1971 geometric mean of 39 samples was 74 $\mu g/m^3$.

2.6.2 Regional Classification

On the basis of the prior measurements of air quality and consideration of the emission inventory, this region is classified as priority II for particulates and priority III for all other pollutants. (See Table 1-1 for justification.) Minimum sampling requirements are:

- Three high volume samplers monitoring particulates, each collecting one 24-hour sample every sixth day.
- One tape sampler collecting a sample every two hours.
- One bubbler monitoring sulfur dioxide, and collecting one 24-hour sample every sixth day.

2.6.3 Minimum Requirements

The requirements for air monitoring equipment and locations to meet the minimum federal standards for this region include the equipment listed above. Monitoring sites for suspended particulates will be at Dothan, Eufaula, and at Abbeville as a background location. The high volume sampler at Dothan is currently located at the Houston County Health

TABLE 2-11. REGION 006 POPULATION (1970 CENSUS)

County	Population
Houston	56,574
Dale	52,938
Coffee	34,872
Covington	34,079
Barbour	22,543
Geneva	21,924
Henry	13,254
	236,184

office, south of town. This high volume sampler should be moved to the roof of either the East Highland Elementary School or the Lake Street Junior High School. Both are one story tall and clear of obstructions. Both are also near the fertilizer plants and the wood product plants.

At Abbeville, the high volume sampler should be located atop the Henry County Hospital which is a one-story building and is located near the middle of town. This location would provide a good background site for this region.

The principal particulate emission sources in Eufaula area a fertilizer plant, waste wood burners, and other agricultural type industries. Many are within a few blocks of the center of town. The most desirable location for the high volume sampler is the center of town atop a platform to be erected on the grass median strip between the two directions of traffic on the road in front of the County Court House. The road is approximately 150 feet wide from curb to curb, power is available, and road dust would not be a problem as the street is paved and traffic is slow.

To complete the minimum requirements, a tape sampler and sulfur dioxide bubbler should be operated at Dothan, at the same location as the high volume sampler.

2.6.4 Expanded Air Quality Surveillance System

To more adequately monitor the long-range air quality in this region, it is desirable that monitoring with a high volume sampler be continued at Clayton. Sampling could continue at the current location which is at the Barbour County Health Department, a one-story brick building. The sampler should be moved from ground level to the roof of the building.

Covington County has the highest area source particulate emission inventory in the region. A high volume sampler located in Andalusia will provide long-term data to show trends in suspended particulate in this county.

Sampling locations and equipment requirements for both the minimum and the expanded air quality surveillance systems are summarized in Table 2-12.

TABLE 2-12

REGION 006 SURVEILLANCE SYSTEM

Minimum Federal Requirements			Expanded Air Quality Network	
Location	Instrument	Pollutant	Instrument	Location
Dothan *	HiVol	Particulate	HiVol	Dothan*
Eufaula				Eufaula
Abbeville (Background)				Clayton
				Andalusia
				Abbeville (Background)
Dothan *	Tape	Particulate	Tape	Dothan*
Dothan *	Bubbler	SO_2	Bubbler	Dothan*

Minimum Federal Requirements Equipment Summary	Expanded Air Quality Equipment Summary
3-HiVols	5-HiVols
1-Tape sampler	1-Tape sampler
1-SO_2 bubbler	1-SO_2 bubbler

* Area of estimated maximum concentration

2.7 REGION 007 - TENNESSEE RIVER VALLEY (ALABAMA) CUMBERLAND MOUNTAINS (TENNESSEE) INTERSTATE AIR QUALITY CONTROL REGION

This interstate region contains a total population of 971,433. The Alabama portion has an area of 8,224 square miles and a population of 702,773. The geography of the region is mountainous and is dominated by the Tennessee River. The area is highly prone to atmospheric stagnations which are enhanced by the hilly terrain. Episode potential is high in this region.

Industrial activity is centered in those areas where river transportation is available. County totals of emissions are shown in the Strategy Section. Regional population by county is shown in Table 2-13.

2.7.1 Existing Air Quality Data

The large body of air quality data from this region gives an excellent perspective on levels of air pollutants. The Tennessee Valley Authority has operated an active sampling program for many years. In the vicinity of the Colbert generation station, there are one continuous sulfur dioxide analyzer, two high volume samplers, two dustfall jars and one ozone sampler. At the National Fertilizer Development Center, near Tuscumbia, there is a meteorological facility with a Climet wind system as well as three high volume samplers and seven stations each for dustfall and fluoride (static monitors). In the remote area of Hytop, Jackson County, a background station monitors suspended particulate, dustfall, fluoride, sulfation, ozone and corrosion effects. In the vicinity of the Widow's Creek generation station, there are two meteorological facilities, each consisting of an Anemograph and a Hygro-thermograph. The air monitoring system consists of six sulfur dioxide monitors (Thomas Autometers), three high volume samplers, five dustfall jars, 13 sulfation plates, two ozone sensors, and four corrosion effects sensors. The data from all of these stations are routinely submitted to the State of Alabama on a quarterly basis.

TABLE 2-13. REGION 007 POPULATION (1970 CENSUS)

County	Population
Madison	186,540
Morgan	77,306
Lauderdale	68,111
Marshall	54,211
Cullman	52,445
Colbert	49,632
DeKalb	41,981
Limestone	41,689
Jackson	39,202
Lawrence	27,281
Franklin	23,933
Marion	23,788
Winston	16,654
	702,773

A special air quality study, funded by an EPA grant, is currently in progress in Huntsville. In addition to high volume samplers at various sites, there are three locations where samples are being collected for gaseous pollutants. One (#5) is at Governor's Drive and Memorial Parkway, one of the highest traffic density intersections in the State. The sampling site is on one of the small islands near the center of the intersection. One (#4) is in the hospital parking lot, near an intersection. The third (#2) is in a small, light manufacturing area. Twenty-four hour gaseous samples are collected approximately five times per month. Samples for sulfur dioxide, nitrogen dioxide, and nitric oxide are collected using gas bubblers and analyzed by the West-Gaeke and Jacobs-Hochheiser methods, respectively. Grab samples for carbon monoxide and total hydrocarbons are collected in plastic bags and analyzed by gas chromatography. This is a non-standard procedure so the data are not considered valid for the purpose of regional classification.

A sulfur dioxide sample at site #4 on April 15, 1971, was analyzed as 6,910 $\mu g/m^3$. The next highest value was 16 on May 30. Tampering is suspected for the very high value, so it has been deleted from the reported data.

EPA collected nitrogen dioxide samples during the summer of 1971 at three sampling sites.

The State has operated high volume samplers in Tuscumbia and Decatur since 1967, in Florence since 1970, in Cullman since 1969, and in Guntersville since January of 1971. At the present time, the State is operating three high volume sampling stations in Decatur and five in Scottsboro. Sulfation rate is measured at most of the State's high volume sampler locations in this region.

Highest regional particulate levels have been measured in Tuscumbia, where the 1970-1971 geometric mean was 133 $\mu g/m^3$ and the highest of 32 samples was 354 $\mu g/m^3$.

Sulfur dioxide one-hour maxima in excess of 1.5 ppm were reported by TVA in the Widow's Creek area during 1970.

A summary of air quality data is presented in Appendix A.

2.7.2 Regional Classification

On the basis of measured air quality, the region is classified as priority I for particulates (Tuscumbia) and priority I for sulfur dioxide (Widow's Creek). The region is classified as priority III for nitrogen dioxide, carbon monoxide and oxidants. (See Table 1-1 for justification.)

Minimum sampling equipment requirements for the Alabama portion of this region, based on apportionment by population, are:

- Seven high volume samplers monitoring particulates, each collecting one 24-hour sample every sixth day, and three tape samplers collecting a sample every two nours.
- Five bubblers monitoring sulfur dicxide and collecting one 24-hour sample every sixth day in addition to two continuous sulfur dioxide monitors.

2.7.3 Minimum Requirements

One high volume sampler will be operated atop the Alabama Highway Division Office on the west side of Decatur, which is two to five miles from four major chemical companies. Prevalent winds make this location a site of maximum concentration in this community.

One high volume sampler will continue to be operated at the Jackson County Health Center at Scottsboro. Sources nearby include an aluminum plant about five miles south of town, numerous textile companies, and a large concrete plant northwest of town.

Russellville will have a high volume sampler operated on the lawn of the North Alabama Hospital south of town, which is within 1/2 to 1 mile of a secondary nonferrous smelting plant.

For this interstate region, a background site will be established at Moulton. The best site for the high volume sampler is atop the one-story Laurence County High School.

The high volume sampler at the Huntsville NASN station, at its current location in the downtown-center city, will be continued.

In the Florence-Sheffield area, two high volume sampling stations will be operated. One location will be top of the Lauderdale County Court House in Florence. This sampler is currently operated on the lawn approximately five feet from the building, which strongly affects the sample validity. The other high volume sampler in the Florence-Sheffield area should be located in the Muscle Shoals industrial complex. A readily apparent best site has not been located and will require a more detailed analysis of the Muscle Shoals area. Until this site is located and secured, the Tuscumbia sampler will be moved to the roof of Deshler High School from the current location beside the Health Department building. The current site is adversely affected by close proximity to the building.

Three tape samplers are required. They will be located with the high volume samplers at Florence, Tuscumbia (or Muscle Shoals when the sampler is moved) and Scottsboro.

The minimum requirements call for five sulfur dioxide bubblers. Bubblers will be installed and operated at the same locations as the high volume samplers at Decatur, Florence, and Tuscumbia (Muscle Shoals). A

sulfur dioxide bubbler will be sited in Brilliant because of a large coke operation there. A sulfur dioxide bubbler will be located at TVA monitoring site #3-1 at Widow's Creek as a backup to the continuous monitor. The two continuous sulfur dioxide monitors will be located at the Florence sampling site and at Widow's Creek TVA site #3-1.

The regional episode stations are Widow's Creek (SO_2), Florence (particulate), and Tuscumbia (Muscle Shoals) (particulate and SO_2).

2.7.4 Expanded Air Quality Surveillance System

The expanded monitoring system for this region is that required as the minimum to meet federal specifications plus the data made available by the Tennessee Valley Authority plus some nitrogen dioxide bubblers. This combined information will adequately define the long-range air quality in the Alabama portion of this region. Should any of the current sampling stations of TVA be discontinued, the change and its effect upon the information available should be reevaluated. This does not preclude the use of additional equipment to perform special studies or to augment or verify the available data.

TVA operates nine high volume samplers in Alabama. The two samplers located near the Colbert Steam Plant are on the south side of U.S. 72, 1.8 miles west of the steam plant entrance, and approximately 6.5 miles west on Gundeford Road at Alabama 20W.

Samplers located near the National Fertilizer Development Center include one on the TVA reservation near the maintenance garage, one at the TVA nursery, and one at Wilson Dam.

TVA high volume samplers located near Widow's Creek include one on the right side of Johnson Street, 200 feet north of Alabama Street in Bridgeport, one on McFarlane Farm on County Road, 1.3 miles west of Reece Ferry, near Bridgeport, and one located 2.5 miles southeast of the generating station.

One TVA high volume sampler is located near Hytop, Alabama at the junction of upstate Route 79 and a gravel road to Route 6, three miles north of Skyline.

Nitrogen dioxide bubblers will be operated in Huntsville, Florence, Tuscumbia (Muscle Shoals) and at Moulton to establish the regional levels of this pollutant.

Sampling locations and equipment requirements for both the minimum and expanded air quality surveillance systems are summarized in Table 2-14.

Table 2-14. REGION 007 SURVEILLANCE SYSTEM

Minimum Federal Requirements			Expanded Air Quality Network	
Location	Instrument	Pollutant	Instrument	Location
Florence	HiVol(s)	Particulate		
Tuscumbia *				
Decatur				
Scottsboro (Health Dept.)				
Russellville				
Huntsville (NASN)				
Moulton (Back-ground)				
Florence	Tape	Particulate		
Tuscumbia *				
Scottsboro				
Decatur	Bubblers	SO_2		
Florence				
Tuscumbia				
Brilliant				
Widow's Creek Site #3-1				
Tuscumbia	Continuous	SO_2		
Widow's Creek #3-1 *				

Recommended network is that to meet the minimum federal requirement plus the data available from the equipment operated by the Tennessee Valley Authority which includes the following:

3 * - High Volume Samplers - NFDC
2 - High Volume Samplers - Colbert
3 - High Volume Samplers - Widow's Creek
1 - High Volume Sampler - HYTOP
6 - Conductimetric SO_2 Monitors - Widow's Creek
1 - Conductimetric SO_2 Moniters - Colbert
1 - Climet Wind System - Colbert
2 - Anemographs - Widow's Creek
2 - Hygro Thermograph - Widow's Creek

Plus bubblers for NO_2

Table 2-14. (continued)

Minimum Federal Requirements			Expanded Air Quality Network	
Location	Instrument	Pollutant	Instrument	Location
		NO_2	Bubbler	Florence
				Tuscumbia
				Huntsville
				Moulton

Minimum Federal Requirements Equipment Summary

7-HiVol(s)
3-Tape samplers
5-Bubblers (SO_2)
2-Cont. SO_2

Expanded Air Quality Network Equipment Summary

16-HiVol(s)
3-Tape Samplers
5-Bubblers (SO_2)
2-Continuous SO_2

4-NO_2 Bubblers
7-Conductimetric SO_2
1-Climet Wind System
2-Anemograph
2-Hygro Thermograph

* Area of estimated maximum concentration
Episode monitoring station

3.0 SAMPLE COLLECTION AND ANALYSIS

Sample collection and analytical procedures for suspended particulate by high volume sampler, SO_2 by the bubbler method, NO_2 by the bubbler method, CO by nondispersive infrared spectrometry and photochemical oxidants corrected for interferences due to nitrogen oxides and sulfur oxides are described in detail in the April 30, 1971, Federal Register, Part II, National Primary and Secondary Ambient Air Quality Standards

Performance specifications for continuous instruments measuring sulfur dioxide, carbon monoxide and photochemical oxidant (corrected for NO_2 and SO_2) are stated in paragraph 420.17 of the August 14, 1971, Federal Register, These specifications will be used when new continuous instruments for these pollutants are purchased.

At the present time, there is no standard procedure for the design, operation and analysis of tape samplers. About three manufacturers sell package instruments, and they are similar in design and operation. The instrument design which includes a built-in spot evaluator (a light source, photocell and recorder) will be used in the State of Alabama so that there will be no time lag in acquiring data during any air pollution emergency episode stage.

Procedures for selecting sampling site locations are defined in EPA Publication No. AP-98, "Guidelines: Air Quality Surveillance Networks." One section of this publication refers to site selection guidelines:

1. Uniformity in height above ground level is desirable for the entire network within the region. Some exceptions may include canyons, high-rise apartments, and sites for special-purpose samplers.

2. Constraints to airflow from any direction should be avoided by placing inlet probes at least 3 meters from buildings or other obstructions. Inlet probes should be placed to avoid influence of convection currents.

3. The surrounding area should be free from stacks, chimneys, or other local emission points.

4. An elevation of 3 to 6 meters is suggested as the most suitable for representative sampling, especially in residential areas. Placement above 3 meters prevents most reintrainment of particulates, as well as the direct influence of automobile exhaust.

The SAROAD system for numerical identification of pollutant sampled, type of instrument, etc., will be the standard reporting format.

High volume samplers and bubblers will be operated on a midnight-to-midnight schedule. Seven day timers will be used to facilitate the operation of these instruments, so the sample changing can be conveniently accomplished by county sanitarians, fire department personnel, or other reliable persons who will operate the equipment.

High volume filters are analyzed for gross weight and, at the state lab and in Mobile, for sulfate, nitrate and benzene soluble fractions. The analyses for sulfate and nitrate fractions will be discontinued until such time as research studies show that the resulting data are of specific value to state and local programs. The filters from NASN high volume samplers are analyzed for many individual components, and these results will provide long-term trend information.

It will be of value to continue some analyses for the benzene-soluble fraction of suspended particulates, especially in Mobile. Since any analytical determination beyond total suspended particulate is outside the minimum federal requirements, the level of work performed will be based on available resources and manpower.

The state will provide calibration services for all instruments which are beyond the scope of local agencies' resources. For continuous sulfur dioxide analyzers, a portable dilution system utilizing permeation tubes will be used. For continuous oxidant analyzers, the procedure is described in the April 30, 1971, Federal Register defining ambient air quality standards. For carbon monoxide, each instrument will have a supply of zero air and span gas for routine calibration checks. High volume samplers and tape samplers must be checked to verify their air flow rate on at least a twice-yearly basis. The air flow rate of bubblers should be checked before and after every sample.

4.0 DATA HANDLING

The office of the state air pollution program in Montgomery will be the repository for all air quality data from the state. In those instances where local programs collect, analyze and report their own data, the information will be sent to Montgomery for transmittal to EPA in conformity with the reporting requirements of Paragraph 420.7 of the August 14, 1971, Federal Register.

High volume samplers represent the largest number of sampling units which will be used in the state. Each sampler will be operated on a schedule such that one 24-hour, midnight-to-midnight sample is collected every sixth day. All samplers will operate on the same schedule. The parameters to be determined for each sampling site are:

For Hi-Vols

geometric mean
geometric standard deviation
maximum 24-hour value
number of samples

These values are to be reported on an annual basis, updated to the four most recent quarters.

Sulfur dioxide bubblers should be operated on the same sampling schedule as the high volume samplers. Nitrogen dioxide bubblers can be operated either on this schedule or on a schedule where one 24-hour midnight-to-midnight sample is collected every fourteenth day. The state may publish a uniform schedule for all samplers operating within the state, or the NASN schedule could be used.

For statistical processing of data, artificial values of $3\mu g/m^3$ will be substituted for zero sulfur dioxide readings, and $10\mu g/m^3$ will be substituted for zero nitrogen dioxide readings. These values, representing a best estimate of background values, will be used unless graphical techniques are utilized to determine geometric standard deviations.

Following are the parameters to be reported for bubblers:

For SO_2 and NO_2

arithmetic mean
geometric standard deviation
maximum 24-hour value
number of samples

These values are to be reported on an annual basis, updated to the four most recent quarters.

Tape sample data will be reported on the basis of annual (most recent four quarters) arithmetic average, and maximum 2-hour value.

Data from continuous gas samplers will be acquired on magnetic tape cartiridges, e.g., the Westinghouse system, and sent to the state for data processing. This can either be accomplished using in-house computer facilities or by contract. Data will be processed to determine:

For CO

arithmetic average
geometric standard deviation
maximum 24-hour value
maximum 8-hour value
maximum 1-hour value
frequency distribution

For Oxidants

geometric standard deviation
maximum 1-hour value
frequency distribution

For SO_2

arithmetic average
geometric standard deviation
maximum 24-hour value
maximum 1-hour value
frequency distribution

For Non-Methane Hydrocarbons

aritmetic average

geometric standard deviation

maximum 3-hour value

maximum 1-hour value

maximum 6 a.m.-9.a.m. value

Caution is noted concerning the statistical treatment of air quality data from the State of Alabama. Much of the literature describing the procedures for statistical treatment of air quality data refers to the log normal characteristics of frequency distribution curves for most pollutants. This is generally valid in situations where the air pollution monitor is located in a heavily urbanized area where many sources of the pollutant of interest surround the monitoring station. This will not be the case in many of the smaller urban and rural areas where air samples will be taken in the State of Alabama. Although it is beyond the minimum federal requirements, it will be of value for interpretation of air quality data if the frequency distribution is reported.

5.0 SURVEILLANCE SYSTEM EQUIPMENT ACQUISITION

Within the State of Alabama the following air pollution monotoring equipment that meets Federal specifications was either previously purchased or is currently on order: (See Table 5-1 for list of available approved equipment)

86 - High Volume Samplers
11 - Tape Samplers
2 - Coulometric SO_2 Analyzers
1 - CO Analyzer NDIR
2 - Colorimetric Continuous Oxidant Analyzers
19 - Bubblers

This equipment is owned or on order by one of the following Monitoring Operations:

State of Alabama
Tennessee Valley Authority
National Air Sampling Network
Mobile County Board of Health
Jefferson County Board of Health

Equipment which does not meet Federal specifications but is available is as follows:

1 - Colorimetric Continuous NO_2
7 - Conductimetric SO_2 Monitors
1 - Total hydrocarbon, flame ionization

The State of Alabama is using equipment that is on loan from EPA, which is not included with the equipment available to meet the minimum Federal requirements.

This equipment consists of EPA owned trailers in use at Mobile and Birmingham. They contain:

2 - Colorimetric Continuous NO_2
2 - Colorimetric Continuous NO_x
2 - Coulometric Continuous SO_2
2 - CO Analyzers, NDIR

Table 5-1. AVAILABLE APPROVED EQUIPMENT

EQUIPMENT	OWNER					TOTAL
	STATE OF ALABAMA	JEFFERSON COUNTY	MOBILE COUNTY	NASN	TVA	
High Volume	57	10	6	4	9	86
Tape	6	5	2			13
Continuous SO_2	2					2
Continuous CO		1				1
Continuous Ox	1	1				2
Bubblers (SO_2 and/or NO_2)	6	10	2	3		21

2 - Total hydrocarbon - flame ionization
2 - High Volume Samplers
2 - Wind Speed and Direction
2 - Tape Samplers

Episode Stations, Minimum Requirements

As episode instrumentation will be operational within one year after EPA approved of the Implementation Plan, available equipment is first allocated to this use.

The list of the Episode Monitoring Stations minimum requirements is shown in Table 5-2. The necessary equipment is summarized below and detailed in Table 5-3.

10 - High Volume Samplers
10 - Tape Samplers
4 - Continuous SO_2
5 - Continuous CO
4 - Continuous Ox

When the required equipment is compared to the available equipment, Table 5-4, it is established that the State of Alabama must purchase the following equipment to meet the minimum standards for episode monitoring.

1 - Tape Sampler
1 - Mag Tape Single Cabinet - 3 Signal
2 - CO Continuous Monitors
2 - Recorders for CO Monitors
2 - Ox Continuous Monitors
2 - Recorders for Ox Monitors
2 - SO_2 Continuous Monitors
2 - Recorders for SO_2 Monitors
3 - Mag Tape Single Cabinet - Single Signal 0-5 volts
5 - Mag Tape Single Cabinet - Single Signal 0-1 volts

The total cost of this equipment is approximately $38,128.00. With a 10% allowance for spare parts and servicing equipment the total is approximately $41,950.00.

TABLE 5-2. EPISODE MONITORING STATIONS: MINIMUM REQUIREMENTS

Region		
001	None	
002	Montgomery: Fire Station #5	SP
003	Childersburg	SP
	Gadsden 0440	SP
004	North Birmingham	SP, CO, OX
	Birmingham - Downtown	SP, CO, OX
	Fairfield City Hall	SP, CO, OX
005	Mobile: WKRG Transmitter	SP, OX
	Mobile: NASN	SP
	Salco	SO_2
006	None	
007	Widow's Creek: TVA #3	SO_2
	Tuscumbia	SP, SO_2
	Florence	SP

Key: SP = suspended particulates (high volume and tape)

SO_2 = sulfur dioxide (continuous)

CO = carbon monoxide (continuous)

OX = oxidant (continuous)

Table 5-3. MINIMUM REQUIRED EPISODE STATION EQUIPMENT

EQUIPMENT	REGION 001	002	003	004	005	006	007	TOTAL
Hi Vol		1	2	3	2		2	10
Tape*		1	2	3	2		2	10
Continuous SO_2				1	1		2	4
Continuous CO				3				3
Continuous Ox				3	1			4

REGION	LOCATION	MINIMUM EQUIPMENT	EQUIPMENT AVAILABLE (SOURCE)	EQUIPMENT TO BE PURCHASED	ITEM $ COST	TOTAL MONITOR $ COST
001	None					
002	Montgomery	1 - Hi Vol	1 - Hi Vol (State)			
	Fire Station #5	1 - Tape	1 - Tape (State)			
003	Childersburg	1 - Hi Vol	1 - Hi Vol (State)			
		1 - Tape	1 - Tape (State)			
	Gadsden 0440	1 - Hi Vol	1 - Hi Vol (State			
		1 - Tape	1 - Tape (State)			
004	Birmingham					
	N. Birmingham	1 - Hi Vol	1 - Hi Vol (Jefferson Co)			
		1 - Tape	1 - Tape (Jefferson Co)			
		1 - CO Continuous	1 - CO Continuous (Jefferson Co)	1-3 Channel Mag Tape for CO, Ox, So_2 Continuous Monitoring	2150.00	2150.00
		1 - Ox Continuous	1 - Ox Continuous (Jefferson Co)			
		1 - SO_2 Continuous	1 - SO_2 Continuous (State)			
	Downtown	1 - Hi Vol	1 - Hi Vol (Jefferson Co)			
		1 - Tape	1 - Tape (Jefferson Co)			

Table 5-4. EPISODE STATION EQUIPMENT - REQUIRED VS. AVAILABLE

REGION	LOCATION	MINIMUM EQUIPMENT	EQUIPMENT AVAILABLE (SOURCE)	EQUIPMENT TO BE PURCHASED	ITEM $ COST	TOTAL MONITOR $ COST
004 (Cont)	Birmingham Downtown (Cont)	1 - CO Continuous		1 - CO Continuous	3500.00	
				1 - Recorder	1000.00	
				1 - Mag Tape Single Channel	736.00	5236.00
		1 - Ox Continuous		1 - Ox Continuous	4000.00	
				1 - Recorder	1000.00	
				1 - Mag Tape Single Channel	826.00	5826.00
	Fairfield City Hall	1 - Hi Vol	1 - Hi Vol (Jefferson Co.)			
		1 - Tape	1 - Tape (Jefferson Co.)			
		1 - CO Continuous		1 - CO Continuous	3500.00	
				1 - Recorder	1000.00	
				1 - Mag Tape Single Channel	736.00	5236.00
		1 - Ox Continuous		1 - Ox Continuous	4000.00	
				1 - Recorder	1000.00	
				1 - Mag Tape Single Channel	826.00	5826.00
005	Mobile WKRG Transmitter	1 - Hi Vol	1 - Hi Vol (Mobile)			
		1 - Tape	1 - Tape (Mobile)			

Table 5-4 . (continued)

REGION	LOCATION	MINIMUM EQUIPMENT	EQUIPMENT AVAILABLE (SOURCE)	EQUIPMENT TO BE PURCHASED	ITEM $ COST	TOTAL CAPITAL $ COST
005 (Cont)	Mobile					
	WKRG Transmitter (Cont)	1 - Ox Continuous	1 - Ox Continuous (State)	1 - Mag Tape Single Channel	826.00	826.00
	NASN	1 - Hi Vol	1 - Hi Vol (NASN)			
		1 - Tape	1 - Tape (Mobile)			
	Salco	1 - SO_2 Continuous	1 - SO_2 Continuous (State)	1 - Mag Tape Single Channel	736.00	736.00
006	None					
007						
	Widow's Creek TVA #3	1 - SO_2 Continuous		1 - SO_2 Continuous	4500.00	
				1 - Recorder	1000.00	
				1 - Mag Tape Single Channel	736.00	6236.00
	Florence	1 - Hi Vol	1 - Hi Vol (State)			
		1 - Tape	1 - Tape (State)			

Table 5-4 . (continued)

REGION	LOCATION	MINIMUM EQUIPMENT	EQUIPMENT AVAILABLE (SOURCE)	EQUIPMENT TO BE PURCHASED	ITEM $ COST	TOTAL MONITOR $ COST
007 (Cont)	Tuscumbia (Muscle Shoals)	1 - Hi Vol	1 - Hi Vol (State)			
		1 - Tape	1 - Tape (State)			
		1 - SO_2 Continuous		1 - SO_2 Continuous	4500.00	
				1 - Recorder	1000.00	
				1 - Mag Tape Single Channel	736.00	6236.00
				TOTAL		38,128.00

Table 5-4 . (continued)

In some instances the physical limitations of the sampling site may require the construction of shelters. These costs, if necessary, will be in addition to the $41,950.00 basic equipment cost.

Balance of Minimum Requirements System

The non-episode surveillance equipment defined by the minimum federal requirements will be operational within two years after approval of the Implementation Plan by EPA. The complete air quality surveillance equipment requirements are shown in Table 5-5. The episode requirements are included in this table, so the balance of the minimum requirements are:

27 - High Volume Samplers

6 - Tape Samplers

15 - SO_2 Bubblers

Comparing the available equipment with the minimum requirement, after consideration of the episode requirements which take first priority, the purchase requirements to complete the minimum system are:

5 Tape Samplers	@ $850	$4,250
3 Bubblers	@ $435	1,305
		$5,555

With a 10% allowance for spare parts and servicing equipment, the total is approximately $6,120.00.

Expanded System

As resources allow the expansion of the air quality surveillance system, certain instrumentation described in Section 2 may be acquired (Table 5-6). To meet these needs, which are over and above the minimum requirements, required instruments are:

TABLE 5-5. MINIMUM EQUIPMENT SUMMARY (TOTAL)

Sampling Equipment	Region 001	Region 002	Region 003	Region 004	Region 005	Region 006	Region 007	Total
High Volume	3	5	6	10	4	3	7	38
Tape	1	2	2	5	2	1	3	16
Continuous SO_2				1	1		2	4
SO_2 Bubbler	1	1	1	3	3	1	5	15
Continuous CO				3				3
Continuous Oxidant				3	1			4

TABLE 5-6. EXPANDED EQUIPMENT SUMMARY (TOTAL)

Sampling Equipment	Region 001	Region 002	Region 003	Region 004	Region 005	Region 006	Region 007	Total
High Volume	6	8	11	21	18	5	16	85
Tape	1	2	2	5	2	1	3	16
Continuous SO_2				1	1		2	4
SO_2 Bubbler	2	2	2	4	3	1	5	19
NO_2 Bubbler	2	1	6	9			4	23
Continuous CO				3	1			4
Continuous Oxidant				3	2			5
Continuous Hydrocarbon					1			1
Wind Speed & Direction					1			1

48 - High Volume Samplers
10 - Bubblers
1 - Continuous CO
1 - Continuous Ox
1 - Continuous Non-methane Hydrocarbon
1 - Wind Speed and Direction

The last four items would be used in Mobile and are discussed in Section 2.5.

With allowances for available equipment, the purchase requirements to implement the expanded air quality surveillance network are:

10 - Bubblers @ $435 =		$4,530
1 - Continuous CO	$3500	
Recorder	$1000	
Mag Tape	736	
		$5,236

1 - Continuous Ox	$4000	
Recorder	1000	
Mag Tape	826	
		$5,826

1 - Continuous HC	$6000	
Recorder	1000	
Mag Tape	736	
		$7,736

1 - Wind Speed and Direction, With Recorder and Mag Tape	$2,600
	$25,928

With a 10% allowance for spare parts and servicing equipment, the total becomes $28,500.

Summary

Utilizing all available equipment where appropriate, the estimated cost of the equipment for the air quality surveillance network is:

Episode Requirement (one year)	$41,950
Balance of Minimum (two years)	6,120
Expanded (no time requirement)	28,500
	$76,570

The equipment acquisition schedule will be nearly the same for all 50 states. Continuous instrument delivery is estimated at 120 - 180 days, and it normally takes at least 30 days of operation to bring a new instrument to smooth operation. The schedule for instrument acquisition calls for issuance of a purchase order no less than seven months prior to the time at which useful data is to be available from that instrument.

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
001	TSP $\mu g/m^3$	Selma	State	12	06/18/69	06/11/70	46			99		46	1.44
			State	12	06/19/70	06/22/71	37			99		45	1.56
		Demopolis	State	11	06/19/69	05/06/70	26			161		55	1.47
			State	4	02/18/71	06/22/71	5			109		69	1.57
		Evergreen	State	6	01/19/71	06/22/71	11			115		35	1.63
		Grove Hill	State	5	02/03/71	06/22/71	10			124		49	1.69
002	TSP $\mu g/m^3$	Phenix City	State	12	06/18/69	06/11/70	31			144		67	1.41
			State	12	06/19/70	06/22/71	32			163		62	1.48
		Troy	State	6	01/04/71	06/22/71	12			104		68	1.39
		Montgomery:											
		Lab	State	5	02/03/71	06/22/71	10			194		87	1.73
		#5	State	5	02/03/71	06/02/71	10			252		117	1.52
		#11	State	5	02/03/71	06/02/71	7			140		63	1.55
		Trenholm	State	5	02/03/71	06/02/71	9			100		63	1.62
		Patterson	State	5	02/03/71	06/02/71	6			80		49	1.59
		Montgomery	NASN	12	/59	/59	25			165		82	1.40
				12	/61	/61	26			157		67	1.48
				12	/63	/63	26			163		76	1.63

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
002 (Cont)	TSP $\mu g/m^3$ (Cont)	Montgomery	NASN	12	/65	/65	25			174		79	1.49
				12	/67	/67	26			137		70	1.47
				12	/68	/68	26			152		76	1.52
				12	/69	/69	26			150		75	1.67
				12	01/02/70	12/14/70	25			256		80	1.70
	SO_2 $\mu g/m^3$	Montgomery	NASN	12	01/04/69	12/14/69	26			24	10		1.71
			NASN	12	01/02/70	12/14/70	22			20	6		1.99
	NO_2 $\mu g/m^3$	Montgomery	NASN	12	01/04/69	12/14/69	24			94	30		1.77
			NASN	12	01/02/70	12/14/70	25			144	43		1.97
003	TSP $\mu g/m^3$	Gadsden	NASN	12	/64	/64	26			161		85	1.53
			NASN	12	/66	/66	26			278		67	1.68
			NASN	12	/68	/68	25			398		80	1.88
			NASN	12	/69	/69	26			126		60	1.50
			NASN	12	01/02/70	12/14/70	26			117		71	1.70
		Gads. 0440	State	5	02/18/71	06/22/71	9			268		106	1.92
		Gads. 0441	State	5	02/18/71	06/22/71	9			275		132	2.07
		Anniston	State	12	06/19/69	06/03/70	46			137		69	1.49
			State	12	06/19/70	06/22/71	38			333		53	1.89

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
003 (Cont)	TSP $\mu g/m^3$ (Cont)	Sylacauga	State	6	01/04/71	06/22/71	12			164		74	1.58
		Talladega	State	6	01/04/71	06/22/71	11			353		83	2.98
004	TSP $\mu g/m^3$	Birmingham	NASN	12	/57	/57				285		117	1.59
			NASN	12	/59	/59				449		125	1.95
			NASN	12	/60	/60				400		122	1.86
			NASN	12	/61	/61				306		113	1.75
			NASN	12	/62	/62				246		126	1.60
			NASN	12	/63	/63				505		129	1.71
			NASN	12	/64	/64				358		101	1.60
			NASN	12	/65	/65				528		144	1.84
			NASN	12	/66	/66				329		128	1.59
			NASN	12	01/02/70	12/14/70	22			629		155	1.59
		N. Birmingham	Jeff.	12	06/65	06/66	141					281	
			Jeff.	12	06/66	06/67	155					244	
			Jeff.	12	06/02/70	05/28/71	57			790		237	1.62
		Bessemer	Jeff.	12	06/65	06/66	127					176	
			Jeff.	12	06/66	06/67	181					199	
			Jeff.	10	08/05/70	05/28/71	44			280		131	1.46
		West End	Jeff.	12	06/65	06/65	145					124	
			Jeff.	12	06/66	06/67	192					167	
			Jeff.	10	08/05/70	05/28/71	43			268		117	1.66

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
004 (Cont)	TSP $\mu g/m^3$ (cont.)	Woodlawn	Jeff.	12	06/65	06/66	126					139	
			Jeff.	12	06/66	06/67	182					149	
			Jeff.		06/02/70	05/28/71	59			511		133	1.62
		Mt. Brook	Jeff.	12	06/02/70	05/28/71	56			140		53	1.56
		Tarrant City	Jeff.	12	06/65	06/66	128					219	
			Jeff.	12	06/66	06/67	183					200	
		Irondale	Jeff.	12	06/65	06/66	152					116	
			Jeff.	12	06/66	06/67	196					122	
		EPA Trailer	EPA	12	06/19/70	05/31/71	275			607		170	1.63
		Leeds 0660	State	6	01/09/71	06/22/71	9			434		162	1.93
		Leeds 0661	State	6	01/09/71	06/22/71	9			251		70	2.29
		Tuscaloosa - A	State	10	08/08/69	06/03/70	34			219		79	1.81
			State	11	07/08/70	05/14/71	24			170		77	1.45
		Tuscaloosa - B	State	5	01/04/71	05/14/71	10			121		69	1.48
		Ragland	State	9	07/15/69	04/10/70	21			250		102	1.87
			State	4	08/20/70	12/02/70	12			301		86	1.84

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
004 (Cont)	TSP ($\mu g/m^3$) (cont.)	Pell City	State	12	06/19/70	06/22/71	35			191		61	1.63
		Oneonta	State	12	06/19/70	06/22/71	20			91		47	1.47
		Jasper	State	12	06/19/70	06/22/71	35			243		92	1.53
		Columbiana	State	6	01/04/71	06/22/71	9			150		74	1.94
	SO_2	Birmingham	NASN	12	01/04/69	12/14/69	23			76	17		2.23
	$\mu g/m^3$		NASN	12	01/02/70	12/14/70	22			23	9		2.22
		EPA Trailer 1st Av N&14th	EPA	7	05/70	12/70	Contin.	194					
	NO_2	Birmingham	NASN	12	01/04/69	12/14/69	22			319	175		1.56
	$\mu g/m^3$		NASN	12	01/20/70	12/14/70	22			447	110		2.34
		EPA Trailer 1st Av N&14th	EPA	10	05/70	03/71	Contin.	158			75		
	CO mg/m^3	EPA Trailer 1st Av N&14th	EPA	3	04/71	07/71	Contin.	37	16				
	Oxidants $\mu g/m^3$	EPA Trailer 1st Av N&14th	EPA	10	05/70	04/71	Contin.	250					

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
005	TSP $\mu g/m^3$	Mobile	NASN	12	/58	/58				485		150	1.91
			NASN	12	/60	/60				284		108	1.89
			NASN	12	/62	/62				247		92	1.83
			NASN	12	/64	/64				387		90	1.85
			NASN	12	/66	/66				442		116	1.66
			NASN	12	/68	/68				298		129	1.57
			NASN	12	/69	/69				296		124	1.51
			NASN	12	01/13/70	12/14/70	23			208		101	1.52
		Central Fire Station	Mob.	7	/66	/66	28			312		114	
			Mob.	10	/67	/67	40			316		115	
			Mob.	12	/68	/68	41			420		134	
			Mob.	12	01/07/69	12/29/69	36			288		145	1.55
			Mob.	9	02/18/70	11/20/70	28			296		130	1.65
		Police Bldg.	Mob.	7	/66	/66	30			235		92	
			Mob.	10	/67	/67	37			240		87	
			Mob.	12	/68	/68	41			239		108	
			Mob.	12	01/07/69	12/29/69	34			272		92	1.73
			Mob.	10	01/18/70	11/10/70	25			376		130	1.77
		State Docks	Mob.	7	/66	/66	30			317		110	
			Mob.	10	/67	/67	39			536		170	
			Mob.	12	/68	/68	47			444		201	
			Mob.	11	01/07/69	11/21/69	31			249		120	1.67
			Mob.	9	02/18/70	11/20/70	24			361		141	1.73

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
005 (Cont)	TSP $\mu g/m^3$ (cont.)	Gen Bullard/ Airport Blvd.	Mob.	7	/66	/66	31			109		42	
			Mob.	10	/67	/67	43			172		47	
			Mob.	12	/68	/68	42			132		53	
			Mob.	12	01/07/69	12/18/69	34			188		46	1.81
			Mob.	10	03/18/70	11/30/70	32			132		35	1.90
		Saraland	Mob.	10	/67	/67	41			144		51	
			Mob.	12	/68	/68	45			129		54	
			Mob.	12	01/07/69	12/29/69	34			161		53	1.74
			Mob.	10	02/18/70	11/30/70	29			137		56	1.84
		Bay Minette	Mob.	5	06/28/69	12/18/69	23			106		58	1.52
		Robertsdale	Mob.	5	07/01/69	12/07/69	22			77		39	1.36
		Atmore	Mob.	6	06/28/69	12/18/69	24			174		74	1.59
		Fairhope	Mob.	5	07/01/69	12/18/69	22			157		65	1.57
		Flomaton	Mob.	6	06/28/69	12/18/69	22			170		56	1.59
		Foley	Mob.	6	07/07/69	12/18/69	22			105		63	1.36

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
005 Cont)	TSP $\mu g/m^3$ (cont.)	Brewton	State	11	06/18/69	05/07/70	33			108		50	1.48
			State	6	01/02/71	06/22/71	16			100		51	1.69
	SO_2 $\mu g/m^3$	Mobile	NASN	12	01/04/69	12/14/69	24			100	15		1.86
			NASN	12	01/02/70	12/14/70	25			30	8		2.64
		Salco	State	4	06/71	10/71	contin.	Approx. 1,400					
	NO_2 $\mu g/m^3$	Mobile	NASN	12	01/04/69	12/14/69	23			147	47		1.78
			NASN	12	01/13/70	12/14/70	24			147	71		1.77
	CO mg/m^3	Mobile	EPA	1	05/07/71	05/31/71	contin.	6					
	Oxidants $\mu g/m^3$	Mobile	NASN	12	01/04/69	12/14/69	23			46	15		
		Mobile	EPA	1	05/17/71	06/28/71	contin.	>200					
006	TSP $\mu g/m^3$	Dothan	State	10	08/19/69	06/11/70	38			225		80	1.51
			State	12	06/19/70	06/22/71	39			202		76	1.66
		Clanton	State	5	02/18/71	06/22/71	9			99		51	1.66

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
007	TSP $\mu g/m^3$	Tuscumbia	State	11	06/18/69	05/15/70	37			588		133	1.54
			State	12	07/08/70	06/22/71	32			354		131	1.54
		Florence	State	10	08/19/69	06/11/70	35			325		92	1.77
			State	12	06/19/70	06/22/71	39			217		100	1.48
		Huntsville	NASN	12	/63	/63	25			166		72	1.61
				12	/65	/65	26			155		83	1.49
				12	/67	/67	26			127		62	1.57
				12	/68	/68	26			132		60	1.44
				12	/69	/69	26			133		58	1.56
				12	01/02/70	12/14/70	26			117		61	1.55
		Cullman	State	12	06/26/69	06/11/70	47			190		70	1.60
				11	06/19/71	05/24/71	35			255		78	1.86
		Decatur	State	12	06/18/69	06/12/70	41			155		73	1.58
				7	01/04/71	07/02/71	126			330		76	1.59
		Scottsboro: Health Depart.	State	11	06/18/69	05/26/70	46			405		135	1.50
				12	07/08/70	06/22/71	37			244		125	1.58
		Scottsboro Waterworks		12	07/08/70	06/22/71	37			284		60	2.05
		" Radio Station		6	01/04/71	06/22/71	12			138		67	1.59
		" Holiday Inn		6	01/04/71	06/22/71	11			272		93	2.11
		" Bridgeport		6	01/04/71	06/22/71	11			111		68	1.58
		Ft. Payne		6	01/04/71	06/22/71	12			105		60	1.54

APPENDIX A (continued)

REGION	POLLUTANT	LOCATION	SOURCE	SAMPLING INTERVAL (MONTHS)	START DATE	END DATE	NO. SPLS.	1 HR MAX	8 HR MAX	24 HR MAX	ANNUAL ARITH MEAN	ANNUAL GEO. MEAN	GEO. STD. DEV.
007	TSP $\mu g/m^3$ (Cont)	Colbert #1	TVA	12	01/01/70	12/29/70	131			197		52	1.73
		Colbert #2	TVA	12	01/01/70	12/29/70	130			335		69	1.99
		OACD #391	TVA	12	01/01/70	12/31/70	170			181		69	1.65
		OACD #392	TVA	12	01/01/70	12/31/70	172			301		69	1.63
		OACD #393	TVA	12	01/01/70	12/31/70	162			172		64	1.55
		Hytop	TVA	12	01/03/70	12/29/70	104			293		58	1.83
		Widow's Creek #1-2	TVA	12	01/01/70	12/29/70	127			362		125	1.73
		Widow's Creek #3-1	TVA	12	01/01/70	12/29/70	128			417		87	1.89
		Widow's Creek #4	TVA	12	01/01/70	12/29/70	131			471		148	1.68
	SO_2 $\mu g/m^3$	Colbert #1	TVA	12	01/01/70	12/31/70	Cont	1,834					
		Widow's Creek	TVA	12	01/01/70	12/31/70	Cont	3,930+					
	NO_2	Huntsville #4	Huntsville	5	03/18/71	07/31/71	25				16	2	
		Huntsville #2	EPA	5	06/18/71	10/31/71	28					79	
		Huntsville #4	EPA	5	06/18/71	10/31/71	29					86	
		Huntsville #5	EPA	5	06/18/71	10/31/71	29					34	
	CO	Huntsville #2	Huntsville	4	03/27/71	07/31/71	20				15.4	6.0	
		Huntsville #4	Huntsville	4	03/27/71	07/31/71	21				11.5	5.5	
		Huntsville #5	Huntsville	4	03/27/71	07/31/71	21				16.4	6.2	

APPENDIX A (continued)

APPENDIX B

SAMPLE SITE LOCATION

Region	Site Name	Location	UTM Northing	UTM Easting
001	Selma	East Side of Town	3580	500
	Demopolis	High School	3590	420
	Evergreen	Central	3480	510
	Grove Hill	Hospital	3570	425
	Pennington	Route 114 lift bridge	3560	400
	Jackson	Leroy or Jackson High School	3490	415
002	Montgomery NASN	515 W. Jefferson Davis Ave.	3580	570
	Fire Station #5		3580	570
	Boylston	Catholic Church	3590	570
	Trenholm School		3580	570
	Troy	TSU Campus	3520	600
	Tuskeegee	TSC Campus	3590	620
	Opelika	Lee County Hospital	3610	650
	Phenix City	Russell County Health Clinic	3590	690
003	Gadsden NASN	109 S. 8th St.	3765	590
	0440	East Gadsden Community Center	3765	590
	0441	Gadsden Street Department	3765	590
	Talladega	Federal Building	3700	585
	Anniston	Blue Mountain Post Office	3730	610
	Anniston	Court House	3725	610
	Anniston	Quintard Mall, Oxford	3720	610
	Alexander City	Junior College	3640	600
	Ashland		3680	610
	Childersburg	Trade School	3680	560
	Sylacauga	Health Clinic	3670	570
004	Birmingham			
	North Birmingham		3712.5	517.3
	Downtown		3708.5	518.0
	Fairfield		3705.3	507.8

Region	Site Name	Location	UTM Northing	UTM Easting
	Mountain Brook		3706.9	522.6
	Irondale		3710.5	527.3
	Bessemer		3695.3	504.4
	Tarrant City		3715.8	521.0
	Woodlawn		3710.8	522.4
	West End		3705.7	513.6
	Pratt City		3710.1	511.1
	Dolomite		3702.8	503.7
	NASN		3707.0	518.7
	Tuscaloosa	County Health Dept 3025 Green Grove Lane	3675.	445
	Leeds (0660)	202 9th St. S.E.	3715	540
	Jasper	5th & 17th Street	3745	470
	Background		Not Sited	
	Holt		3680	450
	Pell City	205 19th St. N.	3720	565
	Ragland	City Hall	3735	580
	Fayette		3730	425
	Columbiana	Mildred & Milner	3670	530
005	Mobile			
	WKRG		3398.8	398.6
	City Fire Station		3395.4	399.3
	Salco		3425.4	401.8
	Creola		3417.9	400.8
	Saraland		3410.6	397.5
	Pritchard		3400.1	396.9
	State Docks Admin Bldg.		3397.9	399.9
	County Health Dept. (NASN)		3396.4	396.9
	Police Bldg.		3395.5	400.6
	Gen Bullard & Airport Blvd.		3394.2	387.8
	Brookley Field		3389.5	398.3
	Cottage Hill		3391.5	390.2

Region	Site Name	Location	UTM Northing	UTM Easting
	Theodore		3379.7	387.3
	Hollingers Island		3380.4	394.5
	Government & Jackson		3395.2	399.3
	Atmore		3435	455
	Brewton	204 Sowell Street	3440	495
	Robertsdale		3380	430
006	Dothan	East Highland School	3450	650
	Abbeville	Henry County Hospital	3495	665
	Eufaula	County Court House	3530	675
			3460	525
	Clayton	Barbour County Court House	3525	645
007	Florence	Lauderdale County Court House	3855	440
	Tuscumbia	Deshler High School	3845	435
	Decatur	Ala. Highway Division Office	3830	500
	Scottsboro	Jackson County Health Dept.	3840	585
	Russellville	North Alabama Hospital	3820	430
	Huntsville (NASN)	304 Eustis Ave.	3850	545
	Moulton	Laurence County High School	3810	475
	Widow's Creek Site #3		3865	615